Food Technology Abstracts

No. 171
JANUARY 1982

National Information Centre
for Food Science and Technology,
Central Food Technological
Research Institute, Mysore

NISSAT
Department of
Science and Technology

CONTENTS

FOOD TECHNOLOGY ABSTRACTS

1982

CFTRI, R.C. NAGPUR

10.	OILSEEDS AND NUTS	...	
11.	TUBERS AND VEGETABLES	...	19
12.	FRUITS	...	22
13.	SUGAR, STARCH AND CONFECTIONERY	...	26
14.	BAKERY PRODUCTS	...	27
15.	MILK AND DAIRY PRODUCTS	...	28
16.	MEAT AND POULTRY	...	29
17.	SEAFOODS	...	34
18.	PROTEIN FOODS	...	36
19.	FRUIT JUICES AND BEVERAGES	...	36
20.	OILS AND FATS	...	39
21.	SPICES AND CONDIMENTS	...	39
22.	SENSORY EVALUATION	...	40
23.	FOOD STORAGE	...	-
24.	INFESTATION CONTROL AND PESTICIDES	...	40
25.	BIOCHEMISTRY AND NUTRITION	...	40
26.	TOXICOLOGY AND HYGIENE	...	43
	INDEX		

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL ...	138
2.	FOOD PROCESSING AND PACKAGING ...	138
3.	FOOD ENGINEERING AND EQUIPMENT ...	139
4.	FOOD CHEMISTRY AND ANALYSIS ...	140
5.	FOOD MICROBIOLOGY ...	142
6.	FOOD ADDITIVES ...	142
7.	CEREALS ...	144
8.	MILLETS ...	149
9.	PULSES ...	150
10.	OILSEEDS AND NUTS ...	152
11.	TUBERS AND VEGETABLES ...	155
12.	FRUITS ...	157
13.	SUGAR, STARCH AND CONFECTIONERY ...	161
14.	BAKERY PRODUCTS ...	162
15.	MILK AND DAIRY PRODUCTS ...	164
16.	MEAT AND POULTRY ...	166
17.	SEAFOODS ...	170
18.	PROTEIN FOODS ...	-
19.	FRUIT JUICES AND BEVERAGES ...	172
20.	OILS AND FATS ...	174
21.	SPICES AND CONDIMENTS ...	175
22.	SENSORY EVALUATION ...	177
23.	FOOD STORAGE ...	-
24.	INFESTATION CONTROL AND PESTICIDES ...	177
25.	BIOCHEMISTRY AND NUTRITION ...	178
26.	TOXICOLOGY AND HYGIENE ...	180
	INDEX	

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL ...	185
2.	FOOD PROCESSING AND PACKAGING ...	185
3.	FOOD ENGINEERING AND EQUIPMENT ...	186
4.	FOOD CHEMISTRY AND ANALYSIS ...	186
5.	FOOD MICROBIOLOGY ...	189
6.	FOOD ADDITIVES ...	190
7.	CEREALS ...	191
8.	MILLETS ...	194
9.	PULSES ...	196
10.	OILSEEDS AND NUTS ...	199
11.	TUBERS AND VEGETABLES ...	202
12.	FRUITS ...	207
13.	SUGAR, STARCH AND CONFECTIONERY ...	210
14.	BAKERY PRODUCTS ...	211
15.	MILK AND DAIRY PRODUCTS ...	212
16.	MEAT AND POULTRY ...	216
17.	SEAFOODS ...	221
18.	PROTEIN FOODS ...	-
19.	FRUIT JUICES AND BEVERAGES ...	225
20.	OILS AND FATS ...	230
21.	SPICES AND CONDIMENTS ...	231
22.	SENSORY EVALUATION ...	231
23.	FOOD STORAGE ...	232
24.	INFESTATION CONTROL AND PESTICIDES ...	232
25.	BIOCHEMISTRY AND NUTRITION ...	234
26.	TOXICOLOGY AND HYGIENE ...	234
	INDEX	

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL ...	237
2.	FOOD PROCESSING AND PACKAGING ...	237
3.	FOOD ENGINEERING AND EQUIPMENT ...	238
4.	FOOD CHEMISTRY AND ANALYSIS ...	238
5.	FOOD MICROBIOLOGY ...	239
6.	FOOD ADDITIVES ...	240
7.	CEREALS ...	243
8.	MILLETS ...	247
9.	PULSES ...	248
10.	OILSEEDS AND NUTS ...	250
11.	TUBERS AND VEGETABLES ...	253
12.	FRUITS ...	255
13.	SUGAR, STARCH AND CONFECTIONERY ...	257
14.	BAKERY PRODUCTS ...	258
15.	MILK AND DAIRY PRODUCTS ...	259
16.	MEAT AND POULTRY ...	263
17.	SEAFOODS ...	268
18.	PROTEIN FOODS ...	273
19.	FRUIT JUICES AND BEVERAGES ...	273
20.	OILS AND FATS ...	274
21.	SPICES AND CONDIMENTS ...	275
22.	SENSORY EVALUATION ...	276
23.	FOOD STORAGE ...	276
24.	INFESTATION CONTROL AND PESTICIDES ...	278
25.	BIOCHEMISTRY AND NUTRITION ...	280
26.	TOXICOLOGY AND HYGIENE ...	281
	INDEX	

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL ...	285
2.	FOOD PROCESSING AND PACKAGING ...	285
3.	FOOD ENGINEERING AND EQUIPMENT ...	285
4.	FOOD CHEMISTRY AND ANALYSIS ...	286
5.	FOOD MICROBIOLOGY ...	286
6.	FOOD ADDITIVES ...	287
7.	CEREALS ...	288
8.	MILLETS ...	290
9.	PULSES ...	292
10.	OILSEEDS AND NUTS ...	294
11.	TUBERS AND VEGETABLES ...	297
12.	FRUITS ...	300
13.	SUGAR, STARCH AND CONFECTIONERY ...	303
14.	BAKERY PRODUCTS ...	304
15.	MILK AND DAIRY PRODUCTS ...	304
16.	MEAT AND POULTRY ...	307
17.	SEAFOODS ...	312
18.	PROTEIN FOODS ...	314
19.	FRUIT JUICES AND BEVERAGES ...	315
20.	OILS AND FATS ...	321
21.	SPICES AND CONDIMENTS ...	322
22.	SENSORY EVALUATION ...	323
23.	FOOD STORAGE ...	-
24.	INFESTATION CONTROL AND PESTICIDES ...	324
25.	BIOCHEMISTRY AND NUTRITION ...	325
26.	TOXICOLOGY AND HYGIENE ...	327
	INDEX	

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL ...	379
2.	FOOD PROCESSING AND PACKAGING ...	379
3.	FOOD ENGINEERING AND EQUIPMENT ...	381
4.	FOOD CHEMISTRY AND ANALYSIS ...	382
5.	FOOD MICROBIOLOGY ...	383
6.	FOOD ADDITIVES ...	384
7.	CEREALS ...	386
8.	MILLETS ...	390
9.	PULSES ...	391
10.	OILSEEDS AND NUTS ...	394
11.	TUBERS AND VEGETABLES ...	396
12.	FRUITS ...	400
13.	SUGAR, STARCH AND CONFECTIONERY ...	404
14.	BAKERY PRODUCTS ...	406
15.	MILK AND DAIRY PRODUCTS ...	409
16.	MEAT AND POULTRY ...	412
17.	SEAFOODS ...	420
18.	PROTEIN FOODS ...	425
19.	FRUIT JUICES AND BEVERAGES ...	425
20.	OILS AND FATS ...	427
21.	SPICES AND CONDIMENTS ...	428
22.	SENSORY EVALUATION ...	429
23.	FOOD STORAGE ...	-
24.	INFESTATION CONTROL AND PESTICIDES ...	429
25.	BIOCHEMISTRY AND NUTRITION ...	430
26.	TOXICOLOGY AND HYGIENE ...	432
	INDEX	

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL ...	435
2.	FOOD PROCESSING AND PACKAGING ...	435
3.	FOOD ENGINEERING AND EQUIPMENT ...	436
4.	FOOD CHEMISTRY AND ANALYSIS ...	437
5.	FOOD MICROBIOLOGY ...	439
6.	FOOD ADDITIVES ...	441
7.	CEREALS ...	442
8.	MILLETS ...	445
9.	PULSES ...	-
10.	OILSEEDS AND NUTS ...	446
11.	TUBERS AND VEGETABLES ...	448
12.	FRUITS ...	450
13.	SUGAR, STARCH AND CONFECTIONERY ...	453
14.	BAKERY PRODUCTS ...	455
15.	MILK AND DAIRY PRODUCTS ...	456
16.	MEAT AND POULTRY ...	457
17.	SEAFOODS ...	462
18.	PROTEIN FOODS ...	463
19.	FRUIT JUICES AND BEVERAGES ...	463
20.	OILS AND FATS ...	468
21.	SPICES AND CONDIMENTS ...	469
22.	SENSORY EVALUATION ...	-
23.	FOOD STORAGE ...	469
24.	INFESTATION CONTROL AND PESTICIDES ...	470
25.	BIOCHEMISTRY AND NUTRITION ...	472
26.	TOXICOLOGY AND HYGIENE ...	473
	INDEX	

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN THIS PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, FRENCH, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FOSTIS), CFTRI, Mysore - 570 013, India.

CONTENTS

		Page No.
1.	GENERAL	477
2.	FOOD PROCESSING AND PACKAGING	478
3.	FOOD ENGINEERING AND EQUIPMENT	479
4.	FOOD CHEMISTRY AND ANALYSIS	480
5.	FOOD MICROBIOLOGY	481
6.	FOOD ADDITIVES	483
7.	CEREALS	484
8.	MILLETS	488
9.	PULSES	489
10.	OILSEEDS AND NUTS	495
11.	TUBERS AND VEGETABLES	500
12.	FRUITS	503
13.	SUGAR, STARCH AND CONFECTIONERY	507
14.	BAKERY PRODUCTS	510
15.	MILK AND DAIRY PRODUCTS	511
16.	MEAT AND POULTRY	515
17.	SEAFOODS	520
18.	PROTEIN FOODS	522
19.	FRUIT JUICES AND BEVERAGES	522
20.	OILS AND FATS	527
21.	SPICES AND CONDIMENTS	528
22.	SENSORY EVALUATION	529
23.	FOOD STORAGE	530
24.	INFESTATION CONTROL AND PESTICIDES	530
25.	BIOCHEMISTRY AND NUTRITION	533
26.	TOXICOLOGY AND HYGIENE	534
	INDEX	—

FOR XEROX COPIES OF THE PERIODICAL ARTICLES INCLUDED IN PUBLICATION AND ALSO FOR TRANSLATION SERVICE (GERMAN, ITALIAN AND SPANISH),

PLEASE CONTACT:

Head, Food Science & Technology Information Service (FO:
CFTRI, Mysore - 570 013, India.

GENERAL

1 VARMA (RP) and PILLAI (ARR). Rural development: Concept, process and problems. *Khadigramodyog.* 27(1); 1980; 85-91

2 SRIVASTAVA (JC). Technology for rural development-I. *Khadigramodyog.* 27(1); 1980; 25-41

3 JHA (SM). Technological capability for rural prosperity. *Khadigramodyog.* 27(1); 1980; 51-5

4 SINGH (RB). Challenge of rural industrialisation. *Khadigramodyog.* 27(1); 1980; 7-9

5 PATHAK (SC) and MAHAPATRO (PC). Rural industrialisation: A case study of Koraput District. *Khadigramodyog.* 27(1); 1980; 92-100

6 PANDITRAO (YA). Industrial policy for eighties. *Khadigramodyog.* 27(1); 1980; 42-50

7 VAN BRAKEL (J). Biogas before 1970: A review. *Trop. Sci.* 22(2); 1980; 105-48

8 MUNCH (S). On some international developmental trends in the production of food and agricultural products. *Ernahrungsforschung.* 24(5); 1979; 136-40 (German)

9 GREENHALGH (P). Production, trade and markets for culinary herbs. *Trop. Sci.* 22(2); 1980; 159-88

The article consists of the following five parts: (1) a brief account of some aspects of each of the major herbs grown in temperate and Mediterranean climates, general observations on their usage, and the increasingly stringent quality requirements of the major markets; (2) general aspects of herb production; (3) analysis of the pattern of world trade in herbs, including trading structure and prices; (4) trends in consumption; and (5) the characteristics of some major markets. The author concludes that as supply difficulties are increasing, and the demand for herbs is also growing at about 10% per annum, there is good scope for potential new producers, provided that they can meet the more stringent quality requirements. KMD

10 FARQUHAR (JW). Educational programs regarding food quality retention during distribution. *Food Technol.* 35(2); 1981; 67-8

Covers the educational programmes developed by the Food Marketing Institute, a trade association of food retailers for the food distribution industry. KAR

11 PHILLIPS (MJ). An analysis of consumer demands for information on the frozen food label. *Food Technol.*35(2); 1981; 61-4

12 FIDANZA (F). Changing patterns of food consumption in Italy. *J. Am. Diet. Assoc.* 77(2); 1980; 133-7

13 RATEAU (JJ). Co-operation of the EEC with developing countries in the food industry sector. *Fruits.* 36(4); 1981; 251-4 (French)

Food industries constitute one of the most important - if not the most important - sectors in the industries of the EEC countries. Projections up to the year 2000 A.D. are quite optimistic for the food and agricultural industries. In fact, their out-turn may even expand, if the EEC sets out to conquer new markets in the developed countries (e.g. Japan, U.S.A.) and develops co-operation with the countries of the Third World. The author has listed centres of research in tropical food preservation that exist in the various EEC countries, and indicated the number of research workers in this field in each country. KMD

14 JANKE (TA). Cost accounting: The vital link to cost effectiveness. *J. Am. Diet. Assoc.* 77(2); 1980; 167-70

15 GREENFIELD (H), MARTLEW (MA), BALMER (N) and WILLS (RBH). Composition of Australian foods. 4. Lebanese foods and meals. *Food Technol. Aust.* 32(11); 1980; 578-81

16 SHANNON (BM) and PARKS (SC). Fast foods: A perspective on their nutritional impact. *J. Am. Diet. Assoc.* 76(3); 1980; 242-7

17 IFT'S EXPERT PANEL ON FOOD SAFETY & NUTRITION. Open shelf-life dating of food. *Food Technol.* 35(2); 1981; 89-96

A scientific status summary by the IFT Expert Panel on Food Safety and Nutrition covers aspects like consumer awareness of open dating, variability of foods in their perishability, problems in distribution, choices of types of open dates, benefits of open dating, legal status of open dating and the possibility of enforcement of regulation. KAR

18 OLSSON (PC). Food inspection: The quest for objectivity. *Food Drug Cosmet. Law J.* 35(3); 1980; 149-9

Discusses: FDA and USDA authority; inspection techniques; development of new programmes; similar elements; different factors; process control; disclosure of information; inspector and inspection; and inspector integrity. BSN

19 BURG (L). A trade association view of the FDA food inspection programs. *Food Drug Cosmet. Law J.* 35(3); 1980; 170-8

Discusses: GMA technical committee; inspection problems; inspection process; records of inspection; photographs; inspectional purpose, trade secret problems, and form 483S. BSN

20 KHAN (P). Food labeling: more or better? *Food Drug Cosmet. Law J.* 35(3); 1980; 160-9

Discusses: label requirements; congestive hyperlabelities; ingredient labeling; illustrations for labeling of cheese, macaroni, bread crumbs and margarine; simplification of terms; label regulations; label legislation (S. 1651 and S. 1652); nutrition information; and interagency communication. BSN

21 CAREY (CJ). Proposal for a realistic improvement in the labeling of processed foods. *Food Drug Cosmet. Law J.* 35(3); 1980; 143-8

Discusses: information on food label; local differences; label legends; and appropriate balance. BSN

22 JANSSEN (WF). The U.S. Food and Drug Law: How it came; how it works. *Food Drug Cosmet. Law J.* 35(3); 1980; 132-2
Discusses: backgrounnd; 1938- the Federal Food, Drug and Cosmetic Act; fundamentals of the law; registration requirements; enforcement based on science; and changes in law. BSN

23 DIXLER (DS). The impact of sensitivity of method on food regulation. *Food Drug Cosmet. Law J.* 35(6); 1980; 349-54
Discusses: similarities and differences; impact on food packaging; carcinogenicity testing; and threshold assessment stage. BSN

24 BRYAN (FL). Hazard analysis of food service operation. *Food Technol.* 35(2); 1981; 78-87
This is an exhaustive review covering aspects like procedures for hazard analysis, and steps involved in hazard analysis especially of the raw materials and products. KAR

25 MADSEN (KO). The anticaries potential of seeds. *Cereal Food World.* 26(1); 1981; 19-25
Seed hulls collected from various sources were listed for this anticaries activity. KAR

26 ALFANO (MC). Dental caries: The nature of the problem. *Cereal Food World.* 26(1); 1981; 5-9
Factors causing dental caries, developmental factors, caries promoting dietary factors, caries preventive dietary factors, current status of research and the control of caries are the aspects covered. KAR

27 BANERJEE (SK). Progress in Seed Technology. *Indian Farming.* 30(8); 1980; 13

28 BORIES (A). Methane fermentation with separation of acidogenic and methanogenic stages applied to treatment of high strength wastewaters (distilleries). *Ann. Technol. Agric.* 29(3); 1980; 509-28 (French)
A study of two-phase methane fermentation on high-strength, distillery, waste-water (wine stillage, COD 85,000 mg O_2/l) has revealed the intermediate metabolism of volatile fatty acids (VFA). During the acidogenic phase, large quantities of VFA are produced from glycerol and lactic acid, in particular, butyric (35-40%), propionic (30-35%), and acetic (15-25%) acids. In the methanogenic phase, microbial populations which have been adapted to this VFA profile carry out complete degradation of acids as well as secondary substances. Methane production was not inhibited by propionic acid even at high concentrations (168 mM/l). The waste treatment performance was very high (98%). The energy balance of this method of waste treatment has been compared with that of biological oxidation. It has been shown that methanogenic fermentation of waste-water can meet 40% of the energy needs for alcohol production. KMD

FOOD PROCESSING AND PACKAGING

PROCESSING

29 LAMBERT (CU). Computerized scheduling for cook/freeze food production plans. *J.Am. Diet. Assoc.* 77(2); 1980; 174-8

30 SLADE (E). Sterilisation. *Food Process. Ind.* 49(589); 1980; 41

31 PFLUG (IJ), SMITH (G), HOLCOMB (R) and BLANCHETT (R). Measuring sterilizing values in containers of food using thermocouples and biological indicator units. *J. Food Prot.* 43(2); 1980; 119-23

The purpose of this study was to compare the F-values (sterilizing value) obtained by physical methods (using thermocouples) and by biological methods (biological indicator units BIU) and to determine whether they are equally effective for agitating and still processes. The physical method is more accurate, but the BIU system makes it possible to measure a much larger number of containers (up to 20 times as many) in the same period of time. The BIU determined with a plastic rod, combined with the count reduction procedure can be used effectively to determine the sterilizing value delivered to cans of food processed in agitating retorts. KMD

PACKAGING

32 MAHADEVAIAH (M). Recent developments in the Federal Republic of Germany on the packaging materials for packing processed food products. *Indian Food Packer.* 35(3); 1981; 88-91

The recent trends in the development and use of packaging materials like metal, glass and plastic containers for processed food products have been discussed with special reference to introduction of tin free steel, aluminium and heat sterilizable glass containers and of plastic laminates and semi rigid containers. BSN

33 MILTZ (J), ELISHA (C) and MANNHEIM (CH). Sensory threshold of styrene and the monomer migration from polystyrene food packages. *J. Food Process. Preserv.* 4(4); 1980; 281-9

Residual monomers from polymeric packaging materials into packaged foods are known to cause health hazards. Styrene is found to irritate human eyes, throat and skin. In rats, 5000 ppm caused deafness within 1 hour of exposure. Styrene oxide induces mutations in yeast and salmonella strains. It has very strong repellent smell and its migration from the packaging material into the contents imparts a disagreeable off-flavour. This paper describes the residual styrene in polystyrene food packages and sensoric threshold level in foods and its migration into food simulants. Residual monomers were detected using gas chromatography. A threshold concentration of styrene in sour cream of 5 ppb was observed at the 95% confidence level by the organoleptic evaluation. It was found that as a result of migration the level of styrene transferred was much higher for oil than water. BSN

34 ANON. Super packaging for salads and after. *Food Flavour. Ingred. Packag. Process.* 1(12); 1980; 28-9

FOOD ENGINEERING AND EQUIPMENT

35 STRATHMANN (H). Application of membrane processes for the separation of molecular mixtures. *Fette Seifen. Anstrichm.* 82(4); 1980; 152-66 (German)

Membrane processes such as electrodialysis, ultrafiltration, and hyperfiltration have found in the past years increasing application as economic separation processes in the purification of drinking water and waste water, and in the concentration as well as fractionation of molecular mixtures in the chemical, pharmaceutical and food industries. The fundamentals of these processes and the methods for the preparation of the corresponding membranes as well as the processing plants are discussed. AA

36 HUTTINGER (KJ) and MULLER (H). Grafted layers with anti-microbial activity - grafting reactions, effect, applications. *Chemie-Ingenieur-Technik.* 82(1); 1980; 77

The technique of grafting has been used to apply a monomolecular layer of some suitable antimicrobial agent on to cellulose. The experiments were partly successful; the possible fields of application are:(a) protection of materials from microbial corrosion; (b) prevention of microbial attack on elements like pipes and filters; and (c) overcoming the problem of slime formation in the food industry. KMD

37 ERB (R) and HORTIG (H-P). Experience gained in setting up a computer-assisted information system in chemical engineering. *Chemie-Ingenieur-Technik.* 52(1); 1980; 70-1 (German)

The STAIRS system of IBM has been adopted in setting up a computerized chemical engineering information system for the HOECHST AG. The collection includes 100,000 documentation entries from HOECHST itself, and another 156,000 entries from three other documentation centres (DECHEMA, DOMA & V&B). The collection is growing at the rate of 38,000 entries per year. The system gives information that is very much up-to-date, only 3 weeks pass before a newly arrived document is fed in. A more complete paper on this topic is being prepared. KMD

38 ANON. What is new in pH meters? *Processing.* Nov. 1980; 27

FOOD CHEMISTRY AND ANALYSIS

39 CHERYAN (M). Phytic acid interactions in food systems. *CRC Crit. Rev. Food Sci. Nutr.* 13(4); 1980; 297-335

Discusses: occurrence; structure and chemistry; solubility characteristics; methods of analysis; binding of phytic acid to proteins; nutritional significance; removal of phytic acid; and effect on functional properties. BSN

40 KITAMURA (K), WEI (C-I) and SHIBAMOTO (T). Water-soluble thiazolidines formed in a cysteamine-D-Glucose browning model system. *J. Agric. Food Chem.* 29(2); 1981; 378-80

Cysteamine and D-glucose were heated in an aqueous solution under simulated cooking conditions. The volatile fraction of the reaction mixture was removed by methylene chloride extraction and the residual aqueous phase was subjected to chemical analysis. 2-(1,2,3,4-Tetrahydroxybutyl) thiazolidine and 2-(1,2,3,4,5-pentahydroxypentyl) thiazolidine were identified by gas chromatography-mass spectrometry following the methylation of the hydroxyl groups of each compound with trimethylchlorosilane and hexamethyldisilazane. Authentic samples of 2-(hydroxyalkyl)thiazolidines were synthesized from cysteamine and corresponding sugars to confirm the structures and flavour descriptions. The authentic thiazolidines exhibited no mutagenic activity toward histidine-requiring *Salmonella typhimurium* strains TA 98 and TA 100. AA

41 TODA (H), SEKIZAWA (J) and SHIBAMOTO (T). Mutagenicity of the L-rhamnose-ammonia-hydrogen sulphide browning reaction mixture. *J. Agric. Food Chem.* 29(2); 1981; 381-4

42 UMHANER (H). Particle size determination in suspensions with the aid of a scattered light counting procedure. *Chemie-Ingenieur-Technik.* 52(1); 1980; 55-8 (German)

FOOD MICROBIOLOGY

43 CANNEL (E) and MOO-YOUNG (M). Solid-state fermentation systems. *Process Biochem.* 15(6); 1980; 24-8

Discusses: composting (general concepts, window process, danoprocess, tower systems, metrosystem, fairfield hardy, continuous vs batch systems); and design considerations (reactor, media preparation, mass transfer, intraparticle, heat transfer, product recovery). BSN

44 GERSTENBERG (H), SITTIG (W) and ZEPF (K). Recovery of fermentation products. *Chemie-Ingenieur-Technik.* 52(1); 1980; 19-31 (German)

YEAST

45 WOODS (FC) and KINSELLA (JE). Isolation and properties of protease from *Saccharomyces carlsbergensis*. *J. Food Biochem.* 4(2); 1980; 79-98

Proteases from autolyzed *Saccharomyces carlsbergensis* were partially purified by ammonium sulphate precipitation and hydroxyapatite column chromatography. pH optima at pH 3.0 and 6.8 were observed. A 7.4-fold purification was achieved for the protease with neutral pH optimum. The general properties of this enzyme were studied. It displayed optimum activity and stability at 37 C and pH 6. It was inhibited by Fe^{+2} and Fe^{+3}, N-ethylmaleimide (NEM), phenylmethanesulphonyl fluoride (PMSF), and sodium chloride (NaCl). It was activated by β-mercaptoethanol and urea. AA

46 BAUCHART (D) and AUROUSSEAU (B). Preparation of heptadecenoic acid from *Candida tropicallis* yeast. *J. Am. Oil Chem.Soc.*57(3);1980; 121-4

47 HEISEL (M). Production of single cell protein by yeast fermentation using oxygen. *Chemie-Ingenieur-Technik.* 52(1); 1980; 60-2 (German)

A newly developed plant for the production of yeast by fermentation on a substrate of ethanol, methanol, or molasses has been described. The novel features of the plant are: (a) a battery of fermenters, working in parallel, and supplied with 95% pure O_2 which can produce 5 kg yeast/m^3h; (b) a process of thickening, using a newly developed sintered metal filter which removes more than 65% of the water from the yeast slurry obtained from the fermenter; and (c) a two-stage vacuum drier that leaves behind only 5% residual moisture in the final product, and ensures that the latter contains all the vitamins and minerals originally present in the yeast. The final product has a protein content of 70%, one-tenth of which is lysine; it can be used both as food and feed. KMD

MUSHROOM

48 BASHAN (Y) and PLATT (M). Increased yield of the cultivated mushroom in Israel by artificial misting. *Hortsci.* 15(3); 1980; 263-4

Artificial misting before the first flush, and between all the flushes increased yield of *Agraricus bitorquis* (Quelet) by 33% and up to 75% in A. *bisporus* (Lange). AA

FOOD ADDITIVES

49 MENON (KKG). Food additives. *Indian Food Packer.* 35(3); 1981; 2-10

Aspects discussed include: preservatives, anti-oxidants, emulsifying agents, stabilizers and thickners, sequestering and buffering agents, bleaching and maturing agents and starch modifiers, food colourants, flavouring agents and flavour boosters, nutrient supplements, non-nutritive and special dietary sweeteners and anti-caking agents. BSN

50 BONIN (AM) and BAKER (RSU). Mutagenicity testing of some approved food additives with the *Salmonella*/microsome assay. *Food Technol. Aust.* 32(12); 1980; 608-11

Of the currently approved 13 food dyes, 5 flavourings and 6 preservatives and other agents listed, only arylomethane dye Violet BNP gave evidence of mutagenicity in direct plate tests with *Salmonella* strains TA 98 and TA 1538. Subsequently this dye has been found positive with other mutagenicity tish systems, con firming that it is, or contains, a DNA-damaging substance. KAR

51 ACHAYA (KT). Regulatory aspects of food additives. *Indian Food Packer.* 35(3); 1981; 11-4

Aspects discussed include: need for food additives, the risks involved, test methodology and problems relating to setting limits for use. BSN

52 KAPUR (OP) and KRISHNAMURTHY (MN). Food additives and prevention of food adulteration act. *Indian Food Packer.*35(3); 1981; 56-9

An attempt has been made to present the aspects like food colours, preservatives, antioxidant, emulsifying and stabilizing agents, flavouring agents and nutrient supplements covered under the Prevention of Food Adulterations Act of India. BSN

53 TRIFIRD (A), BIGLIARDI (D), BAZZARINI (R) and GHERARDI (S). Determination of benzoic and sorbic acids in foods by high-pressure liquid chromatography. *Ind. Conserve.* 56(1); 1981; 22-5 (Italian)

Sorbic and benzoic acids in products such as soft drinks, fruit yoghurts, prunes, polenta, gnocchi, and some bakery products were determined by HPLC on Li Chrosorb R-18 Marck, with phosphate buffer as the mobile phase. The HPLC method was found to be quicker and easier than conventional spectrophotometric procedures, and also more accurate when substances which interfere with the spectrophotometric analysis are present in the products. KMD

54 RANGANNA (S) and RAJNI PADIVAL (A). Chemical preservatives and anti-oxidants. *Indian Food Packer.* 35(3); 1981; 30-45

The article covers: nature of spoilage in foods; methods of control; definition of preservatives, their classification; and mechanism of microbial inhibition. Among the preservatives SO_2 and benzoic acid; and sodium benzoate-sorbic acid and sorbates, propionic acid and propionates; diethyl pyrocarbonate; dehydroacetic acid; peracetic acid; hexamine; new preservatives like N-palmitoyl-L-lysyl-L-lysine, chlorine, N, silver; antibiotics; antioxidants like gallic acid esters; butylated hydroxy anisole, butylated hydroxy touluene and nordihydroguaiaretic acid, tocopherols; ascorbic acid; synergistic action of antioxidants; toxicological problems of preservatives; and evaluation of toxicity preservatives. BSN

55 GOVINDARAJAN (VS). Food flavours. *Indian Food Packer.* 35(3); 1981; 15-24

Aspects discussed include: characteristics of aroma compounds in natural and processed foods; classification of food aroma compounds (hydroxy compounds, aldehydes, ketones, esters, sulphur compounds and other aroma compounds), true fruit flavour alone and combined with other natural flavours, essential oils, redistilled oils, terpeneless essential oils, oleoresins, nature-identical synthetic flavours, aromatic chemicals and artificial flavours, dry solubles and encapsulated flavours. BSN

56 RAMTEKE (RS), EIPESON (WE) and PATWARDHAN (MV). Natural fruit flavours - A review on tropical fruits. *Indian Food Packer.* 35(3); 1981; 60-87

The review discusses the flavour compounds present and their role in fruit aroma production in tropical fruits like banana, grape fruit, lemon, lime, orange, bitter orange, guava, mango, pineapple, papaya and passion fruit. BSN

57 OVENDEN (C). Some problems of flavouring fabricated foods. *Food Technol. Aust.* 32(11); 1980; 558-63

The problems involved in flavouring of the fabricated foods, and the new innovations that are in the offing have also been discussed. KAR

58 JOSEPH (R). Enzymes for the flavour control of processed foods. *Indian Food Packer.* 35(3); 1981; 53-5

Aspects discussed include, food flavours and their origin, flavour loss as a food processing problem, enzymic reconstitution of flavours and sources of enzymes. BSN

59 SANKARANARAYAN (R). Food colours. *Indian Food Packer.* 35(3); 1981; 25-9

Aspects discussed include: synthetic colourants natural colourants and colour requirements of food industry. BSN

60 RAMANATHAN (G). Food emulsifiers. *Indian Food Packer.* 35(3); 1981; 46-52

Aspects discussed include: functions of emulsifiers, formation of emulsion, solubility of emulsifier; food emulsifiers, stability of emulsions, liquid crystals; protein emulsions; equipments used for emulsification like mixers, pressure homogenizer, colloid mill, ultrasonic devices and various types of food emulsions used in food industry. BSN

61 THEVENET (F). Acacia gums in emulsifiers. *Food Flavour. Ingred. Packag. Process.* 1(12); 1980; 15-6

62 THOMAS (TA), DABAS (BS) and CHOPRA (DP). Guar gum has many uses. *Indian Farming.* 30(9); 1980; 19-21

Article covers gum structure, quality and uses, processing including its derivatives and gum industries. KAR

63 FRAZIER (EA) and BERNHARD (RA). Interaction of sunset yellow with copper (II) ion. *J. Agric. Food Chem.* 29(2); 1981; 354-61

Reactions between Sunset Yellow (FD&C No.6) and cupric ion were examined. When the dye combined with cupric ion, a shift in the visible absorption spectrum occurred and hydrogen ion was liberated. The hydrogen ion liberated per dye molecule was determined by potentiometric and spectrophotometric titration. The dye-Cu(II) complex ratio was determined from spectrophotometric data by means of the Scatchard plot, Job's method, and the slope-ratio method. Sunset Yellow reacted with cupric ion in a ratio of 2:1 with the liberation of 0.5 equiv. of hydrogen ion and a ratio of 1:1 with the liberation of one hydrogen ion. Earlier reports of a 1:2 complex could not be confirmed. The dissociation constants for the complexes are 8.87×10^{-4} and 5.37×10^{-4}, respectively. AA

64 FINLEY (JW), WHEELER (EL) and WITT (SC). Oxidation of glutathione by hydrogen peroxide and other oxidizing agents. *J. Agric. Food Chem.* 29(2); 1981; 404-7

CEREALS

65 LORENZ (K). Cereal sprouts. Composition, nutritive value, food applications. *CRC Crit. Rev. Food Sci. Nutr.* 13(4); 1980; 353-85

Discusses: methods of sprouting; sprouts from the malting process; factors effecting germination of seeds; after-repening of seeds; optimal conditions for sprouting and storage; changes in

chemical composition; food applications; and nutritional evaluation of sprouted grains. BSN

66 ANON. Measuring and controlling dust from grain handling. *Milling Feed Fert.* 163(8); 1980; 46,48

A brief account relating to the problem of dust explosion and allied aspects of handling, control and utilisation of grain dust. BSN

67 PUTRANON (R), BOWREY (RG) and FOWLER (RT). Temperature monitors in grain bulk storages. *Food Technol. Aust.* 32(11); 1980; 564-7

A mathematical analysis is used to produce data that indicate the relationship between the temperature at one position in a bed of grain to that at some other point. It is shown that temperature monitors in grain bulk storages will not detect hot pockets until the sensor is within the hot region. AA

68 BARAT (GK), LAL (BM) and NAIK (MS). Nutritional evaluation of cereals and pulses. *Indian Farming.* 30(8); 1980; 47-8,59

Nutritional evaluation of some of the high-yielding foodgrains using rats as experimental animals is mentioned. The crops covered are wheat, rice, maize, barley, sorghum, millets, soyabean and khesari. KAR

69 STOOKEY (GK). Reducing the caries potential of cereal products.. *Cereal Food World.* 26(1); 1981; 10-3

The research undergoing in different laboratories have been summarised. KAR

RICE

70 GREEN (VE) Jr. Rice in Costa Rica (Importance, research, development marketing and industrialization). *IL Riso.* 29(2); 1980; 135-60

71 BHATTACHARYA (KR) and SOWBHAGYA (CM). Size and shape classification of rice. *IL Riso.* 29(3); 1980; 181-5

Various literature proposals on size and shape classification of rice have been examined on the basis of a study of 172 varieties (largely from India) and a literature report on 55 varieties of Southeast Asia. A new classification with appropriate terms and abbreviations has been proposed. The grain type can be indicated by these abbreviations in all reports on work related to rice. AA

72 DUNG (NV), BOWREY (RG) and FOWLER (RT). Variables affecting the drying rate of paddy rice. *Food Technol. Aust.* 32(12); 1980; 604-4

The experiment was carried out at 25 and 35 C, RH of 25 and 50%, air velocities of 0.008 and 0.02 m/s and initial grain moisture contents of 18 and 28% (dry basis). The results showed that air temperature was the major factor affecting the moisture ratio associated with the drying of paddy at any time; however, significant interactions were observed between the following: air temperature, and initial moisture content of rice, air temperature and velocity, air temperature and RH and velocity and initial moisture content. RH showed the least effect on the moisture ratio. KAR

73 JULIANO (BO), PEREZ (CM), BLAKENEY (AB), BRECKENRIDGE (C), TORO (DC), CHOUDHURY (NH), KONGSEREE (N), LAIGNELET (B), MERCA (FE), PAULE (CM),and WEBB (BD). Report of the international cooperative testing on gel consistency of milled rice. *IL Riso*. 29(3); 1980; 233-7

WHEAT

74 LAMKIN (WM), MILLER (BS), NELSON (SW), TRAYLOR (DD) and LEE (MS). Polyphenol oxidase activities of hard red winter, soft red winter, hard red spring, white common, club, and durum wheat cultivars. *Cereal Chem*. 58(1); 1981; 27-31

75 MacARTHUR (LA) and D'APPOLONIA (BL). Effects of microwave radiation and storage on hard red spring wheat flour. *Cereal Chem*. 58(1); 1981; 53-6

A pilot-milled hard red spring wheat flour was subjected to microwave radiation (625 W) for up to 480 second and stored at room temperature for a total of six months. Physical dough properties and baking characteristics were examined immediately and at definite time intervals after radiation treatment. Analysis of the flour and bread indicated that important qualities were adversely affected after 240 seconds of microwave exposure. Exposing the flour to high levels of microwave radiation produced an abnormal farinograph curve exhibiting two peaks, whereas low levels produced bread with loaf volumes and overall bread characteristics equal to or better than those of the control flour. In general, storage improved all samples. The influence of radiation on certain biochemical components was also investigated. When starch pasting characteristics were examined, radiation appeared to have had no adverse effect on paste stability; however, the rate of retrogradation decreased as radiation treatment increased. Decreasing starch intrinsic viscosity and total sugar values were observed with increased radiation levels after storage of the flour for six months. AA

76 RANUM (PM), LOEWE (RJ) and GORDON (HT). Effect of bleaching, maturing, and oxidizing agents on vitamins added to wheat flour. *Cereal Chem*. 58(1); 1981; 32-5

77 KULP (K) and LORENZ (K). Heat-moisture treatment of starches. I. Physicochemical properties. *Cereal Chem*. 58(1); 1981; 46-8

Samples of wheat and potato starch were adjusted to 18,21,24 and 27% moisture, respectively, and heated at 100 C for 16 hours. After the treatment, all starches were dried to a uniform moisture content (7.5%) and their physicochemical properties were studied. Both types of starches given heat-moisture treatment gelatinized over temperature ranges broader and higher than those of the untreated starches. Water-binding capacities and enzyme susceptibilities of treated starches increased as a result of heat-moisture treatment. Swelling powers decreased; the wheat and potato starches adjusted to 27% moisture before being heated had the lowest swelling powers. Solubilities of wheat starch increased, but those of potato starch decreased. Viscograph hot paste consistencies of both types of treated starches decreased and their stabilities during heating increased in general. The tuber starch properties

approached those of the wheat starch. The results indicate that changes in physical order occur within granules of starch as a result of heat-moisture treatment, and a certain degree of starch degradation, higher in the wheat than in the tuber starch, occurs under more drastic treatment conditions. AA

78 LORENZ (K) and KULP (K). Heat-moisture treatment of starches. II. Functional properties and baking potential. *Cereal Chem.*58(1); 1981; 49-52

Samples of wheat and potato starch were adjusted to 18,21,24, and 27% moisture, respectively, and heated at 100 C for 16 hours. After the treatment, all starches were dried to a uniform moisture content (7.5%) and their bread and cake-baking potential and thickening power were evaluated. Bread-baking quality of wheat starch decreased with heat-moisture treatment. Bread volumes were lower and the grain more open. Bread-baking potential of the potato starch improved, however. Bread grain and texture were considerably better; volume improved somewhat. Cake-baking potential of heat-moisture treated wheat starch decreased, whereas that of treated potato starch improved. Cakes baked with treated potato starch were higher in volume and had a less compact and more uniform grain than did those baked with untreated potato starch. The overall quality of cakes, baked with treated potato starch was always lower, however, than that of cakes with untreated wheat starch. Both treated starches had less thickening power in pie fillings than did untreated starch samples. AA

79 CHUNG (OK), SHOGREN (MD), POMERANZ (Y) and FINNEY (KF). Defatted and reconstituted wheat flours. VII. The effects of 0-12% shortening (flour basis) in bread making. *Cereal Chem.*58(1); 1981; 69-73

From 10 g (dry basis) of a composite flour of hard red winter wheats, petroleum ether (PE) extracted 91 mg of free lipids - 69 mg of nonpolar (NL) and 22 mg of polar (PL), and 2-propanol(2-PrOH) extracted 136 mg of total (free plus most of bound) lipids (69 mg of NL and 67 mg of PL). Extracted and reconstituted flours were baked with 0,0.375,0.75,1.5,3,6,9 and 12% commercial shortening. In general, mixing time increased and water absorption decreased as the shortening level increased. Loaf volume (LV) obtained using the control flour increased rapidly as the shortening increased up to 1.5% and changed little after 3%. Shortening increased the LV of PE-defatted flour and its NL-reconstituted flour but decreased the LV of 2-PrOH-defatted flour and its NL-reconstituted flour. Shortening slightly increased the LV of PE or 2-PrOH-defatted flours reconstituted with PL. For reconstituted flour containing total PL but no NL, only about 0.5% shortening was enough for optimum LV and crumb grain, provided only free PL had been removed originally. However, if total PL had been extracted and then added back to 2-PrOH-defatted flour, 3% shortening was required for good LV. In so far as LV and crumb grain were concerned, free PL of wheat flour could be replaced by 9-12% shortening, irrespective of the presence of NL, whereas total PL could not be replaced by any level of shortening. AA

80 MITA (T) and MATSUMOTO (H). Flow properties of aqueous gluten and gluten methyl ester dispersions. *Cereal Chem.* 58(1); 1981; 57-61

OAT

81 PATON (D). Behaviour of hinoat oat starch in sucrose, salt and acid solutions. *Cereal Chem.* 58(1); 1981; 35-9

82 BECHTEL (DB) and POMERANZ (Y). Ultrastructure and cytochemistry of mature oat (*Avena sativa* L.) endosperm. The Aleurone layer and starchy endosperm. *Cereal Chem.* 58(1); 1981; 61-9

MILLETS

MAIZE

83 EKPENYONG (TE). Biological evaluation of improved local maize hybrids using rats. *Food Chem.* 6(2); 1980; 133-7

The incorporation of the opaque-2 gene into local maize-hybrids results in an increase in the levels of lysine and tryptophan and an improved biological value. The average weight gain of rats fed diets containing opaque-2 maize, normal maize and normal maize supplemented with synthetic lysine was 22.6 g, 12.2 g and 18.4 g respectively. KAR

84 JOGINDER SINGH. Approaches to the improvement of productivity and nutritional quality of maize. *Indian Farming*.30(8); 1980; 60-4

Nutritional quality of opaque-2 composites (Ganga-5, Protina, Shakti and Rattan) has been discussed. KAR

85 BROWN (RB), FULFORD (GN), OTTEN (L) and DAYNARD (TB). Note on the suitability for wet milling of corn exposed to high drying temperatures at different moisture contents. *Cereal Chem.* 58(1); 1981; 75-6

Harvested corn at or above 28% moisture should be subjected to drying at 60 C or lower temperature before it gets ready for milling. BSN

86 WILSON (DM), WIDSTROM (NW), MARTI (LR) and EVANS (BD). *Aspergillus flavus* group, aflatoxin, and bright greenish yellow fluorescence in insect-damaged corn in Georgia. *Cereal Chem.* 58(1); 1981; 40-2

Three commercial hybrids of corn (*Zea mays*) were planted at Tifton, GA, in 1975 and two in 1976. Half the plots were inoculated by spraying a conidial suspension of *Aspergillus flavus* on the silks at four, six, and eight days after full silk. Half the plot were infested with larvae of *Heliothis zea*, a corn earworm. Neither infestation nor inoculation had affected insect damage. *A. flavus* group recovery, bright greenish yellow fluorescence, or aflatoxin contamination at 56 days after full silk in either year; however, inoculated ears had a higher incidence of *A. flavus* at earlier dates in 1975. Species of the *A. flavus* group were recovered from 91-100% of the unsterilized test ears at 56 days after full silk across all treatments. Perhaps the inoculation effect was not seen because of high background levels of natural *A. flavus* group invasion of the ears. The incidence of the *A. flavus* group increased with time and maturity of the corn. Aflatoxin levels were significantly different among hybrids in 1975 but not in 1976. AA

PULSES

CHICK PEA

87 SINGH (U) and JAMBUNATHAN (R). Relationship between nonprotein nitrogen and total nitrogen in chickpea (*Cicer arietinum* L.) seed. *J. Agric. Food chem.* 29(2); 1981; 423-4

Nonprotein nitrogen (NPN) in chickpea seeds was extracted by using 80% ethanol and different concentrations of trichloroacetic acid (Cl_3AcOH). Cl_3AcOH extracted considerably higher amounts of nitrogen than did ethanol. NPN in 98 germ plasm accessions of chickpea was determined by use of a Cl_3AcOH concentration of 10% (w/v). NPN as percentage of meal nitrogen varied between 5.84 and 16.48. A positive and highly significant correlation (0.802) was obtained between percentage of the total meal nitrogen and percentage of NPN in the meal. NPN, expressed as percentage of total meal nitrogen, showed a lower but appreciable correlation (0.468) with percentage of the total nitrogen in the meal. AA

BLACK GRAM

88 PADHYE (VW) and SALUNKHE (DK). Studies on black gram (*Phaseolus mungo* L.) trypsin inhibitor. *J. Food Biochem.* 4(2); 1980; 119-38

A trypsin inhibitor isolated from black gram (*Phaseolus mungo* L.) had 75 amino acid residues with an estimated molecular weight of 7892. The kinetic constants K_m and V_{max} as evaluated by the Dixon and Cornish-Bowden plots were 2.7×10^{-5} and 6×10^{-3} M/min. respectively. The dissociation constants of the enzyme-inhibitor complex (Ki') and the enzyme-inhibitor-substrate complex (Ki') were respectively 4×10^{-7} M and 1.9×10^{-6} M. Trypsin inhibition by black gram trypsin inhibitor was of a linear-mixed type. Chemical modification studies suggested the possible involvement of lysine and arginine at the active site of the inhibitor. AA

COW PEA

89 LONGE (OG), Carbohydrate composition of different varieties of cowpea (*Vigna unguiculata*). *Food Chem.* 6(2); 1980; 153-61

Twenty varieties of cowpea analysed showed a total carbohydrate content of 56 to 68%, the major constituent being starch. Average starch value was 37 to 42% although in some of them it was 45 to 48%. Ethanol soluble sugars were verbascose, stachyose, sucrose and raffinose, and traces of fructose and glucose. The total soluble sugar content was 6 to 13%. Values for unavailable carbohydrates for most samples were 11 to 13%. KAR

LUPIN

90 POISSON (J), DROUET (H), Le DEUNFF (Y), MOUSSIT (R) and CHARPENTIE (MJ). Evolution of microflora and germinative capacity evolution of white lupin seeds. (*Lupinus albus* L.) during storage. *Ann. Technol. Agric.* 29(3); 1980; 477-95 (French)

White lupin seeds are very well suited for storage; it is necessary, however, to take into account their initial state which will partly determine their future quality especially the microbiological quality - and use value. Healthy seeds with 13% initial moisture content were well preserved after 20.5 months at 15 C and RH < 75%; at 25 C, the storage period, in good condition, was 4 months. Some recent findings concerning the relations between water content and configuration of the endomembranes have been reported. KMD

OILSEEDS AND NUTS

91 TIWARI (PN) and BURK (W). Seed oil determination by pulsed nuclear magnetic resonance without weighing and drying seeds. *J. Am. Oil Chem. Soc.* 57(3); 1980; 119-21

Pulsed nuclear magnetic resonance (NMR), which takes about 10 seconds per analysis, has been used for rapid nondestructive determination of oil in oilseeds without weighing and oven drying the seed. This has been done by measuring the free induction decay (FID) signal of solid and liquid in oilseeds. The oil values determined by this method for mustard, sunflower, and soyabean seeds have been compared with the values determined by measuring the oil signal alone in the intact seeds,which takes about 2 minutes per analysis with correlation for mustard at 0.988,for sunflower 0.945, and for soyabean 0.931. The reasons for better agreement for mustard and the way of improving it for sunflower and soyabean have been discussed. AA

92 FANTOZZI (P). New conventional vegetable proteins. *Ind. Aliment.* 19(170); 1980; 205-13 (Italian)

GROUNDNUT

93 BASHA (S-MM) and PANCHOLY (SK). Identification of methionine-rich polypeptides in peanut (*Arachis hypogaea* L.) seed. *J. Agric. Food Chem.* 29(2); 1981; 331-5

Peanut seed protein was extracted from the defatted meal with a buffer containing 2 M NaCl, 0.01 M Tris-HCl (pH 8.2), and 0.002% (w/v) NaN_3. The protein extract was then separated into 10 fractions by gel filtration on a Sephacryl S-300 column. Amino acid analysis of the protein eluants from the column showed 1.4%, 2.9%, and 1.2% methionine in fractions V, VI, and VII, respectively. In addition to methionine, fractions VI and VII were found to be rich in cystine (10.75% and 6.52%, respectively). Methionine-containing proteins were also identified by labeling the seed proteins with (^{35}S) methionine, 18 weeks after planting. The (^{35}S) methionine incorporation data was found to be consistent with the methionine content of the fractions which also showed the highest amount of radioactivity in fraction VI. Gel electrophoresis revealed that all the proteins of fraction VI contained (^{35}S) methionine radioactivity. However, the amount of radioactivity varied among the polypeptides of fraction VI. Auto-radiographs of two-dimensional polypeptide maps from fraction VI indicated the presence of four major and two minor radioactive polypeptides with different isoelectric points and molecular weights. AA

94 KUCK (JC) and ST. ANGELO (AJ). Improved method for the quantitative determination of oil content in peanuts and peanut products. *J. Am. Oil Chem. Soc.* 57(3); 1980; 128-9

The official AOCS method of determining oil content in peanut products leads to error as there is some loss of oil when the Henry Nut Slicer is used. Hence, a modified method, involving grinding of peanuts in a Waring blender, and avoiding the refluxing process was developed. The new method is quantitative and uniform, and can be used to determine the oil content of raw or roasted, fresh or rancid peanuts, peanut butter, or other peanut products. KMD

95 DAVIS (ND), GUY (ML) and DIENER (UL). A fluorometric rapid screen method for aflatoxin in peanuts. *J. Am. Oil Chem. Soc.* 57(3); 1980; 109-10

A rapid, inexpensive fluorometric method has been used for screening peanuts for aflatoxin. Peanuts were ground and extracted with methanol, the extract was treated with acidified zinc-acetate/sodium chloride solution, filtered, and diluted with water. The fluorescence of the extracts was then compared with that of aflatoxin-free peanuts. 84% of the samples could be identified as aflatoxin positive (15 ppb+) or aflatoxin negative ($<$15 ppb) by this method. 13.6% of the samples were incorrectly labelled as aflatoxin positive, but most of them showed the presence of mould metabolites other than aflatoxin. Three samples (1.8%) were incorrectly labelled as aflatoxin negative, when they actually contained 20,33 and 34 ppb aflatoxin. KMD

JOJOBA

96 SHANI (A), LURIE (P) and WISNIAK (J). Synthesis of jojobamide and homojojobamide. *J. Am. Oil Chem. Soc.* 57(3); 1980; 112-4

97 VERBISCAR (AJ), BANIGAN (TF), WEBER (CW), REID (BL), SWINGLE (RS), TREI (JE) and NELSON (EA). Detoxification of jojoba meal by lactobacilli. *J. Agric. Food Chem.* 29(2); 1981; 296-302

SOYABEAN

98 MARQUARD (R) and SCHUSTER (W). Protein and fat content of the seed and fatty acid pattern and tocopherol content of the oil of soya-bean varieties from distinctly different locations. *Fette Seifen Anstrichm.* 82(4); 1980; 137-42

The investigations were carried out on material from five soyabean varieties that were grown for two years at locations in Federal Republic of Germany, Austria, Turkey and Tunisia. Considerable differences were observed in protein and fat content, depending on variety, location, and annual climatic conditions. The fatty acid composition of the oil was mainly influenced by location. Differences in tocopherol content of the oil resulted apparently from complex action of various factors. AA

99 ONG (TL). Necessity for the introduction of new quality requirements for crude soyabean oil. *Fette Seifen Anstrichm.* 82(4); 1980; 169-71 (German)

Crude degummed soyabean oils of good and inferior quality were refined on a semi-continuous scale, and the refined oils were investigated with respect to colour and flavour stability. The results showed that the colour and flavour stability of the end product are dependent on oxidation characteristics i.e. *P. anisidine* value, peroxide value and UV absorbance, and from iron and phosphorus content of the crude oil. Therefore it is necessary in addition to current quality requirements, that the maximum values of oxidation characteristics and iron content should be specified. AA

100 HAMERSTRAND (GE), BLACK (LT) and GLOVER (JD). Trypsin inhibitors in soy products: Modification of the standard analytical procedure. *Cereal Chem.* 58(1); 1981; 42-5

The standard AACC method for determining trypsin inhibitor in soy products, based on the tryptic hydrolysis of a synthetic substrate, benzoyl-DL-arginine-p-nitroanalide hydrochloride, produced data in the nonlinear portion of the absorbance-sample size curve (above 60% inhibition of trypsin). These values, when converted to trypsin inhibitor units per ml and extrapolated to zero concentration, tended to give erroneously high values for trypsin inhibitor content. To obviate these problems, the trypsin inhibitor was determined from a single dilution of a sample extract that inhibited at least 40 but no more than 60% of the trypsin. The inhibitor content was calculated from the differential absorbance readings and reported in "pure" or absolute units as milligrams of trypsin inhibitor per gram of sample. Values obtained by the modified procedure, although approximately 20% lower than those obtained by the standard method, were considered a more accurate representation of the trypsin inhibitor actually contained in the sample. In addition, based on 18 replicate sets of data on the same soy sample, the modified procedure was more reproducible, giving a standard deviation of ± 2.4 units vs ± 4.2 units for the standard method. AA

101 ANON. Soya concentrate: A viable competitor to isolate. *Food Flavour. Ingred. Packag. Process.* 1(12); 1980; 12-3

102 YOUNG (VR) and JANGHORBANI (M). Soy proteins in human diets in relation to bioavailability of iron and zinc: A brief overview. *Cereal Chem.* 58(1); 1981; 12-8

Discusses: trace mineral bioavailability, sov proteins and mineral availability in humans; and research directions. BSN

103 KOSHIYAMA (I), KIKUCHI (M), HARADA (K) and FUKUSHIMA (D). 2S globulins of soyabean seeds. 1. Isolation and characterization of protein components. *J. Agric. Food Chem.* 29(2); 1981; 336-40

104 KOSHIYAMA (I), KIKUCHI (M) and FUKUSHIMA (D). 2S globulins of soyabean seeds. 2. Physicochemical and biological properties of protease inhibitors in 2S globulins. *J. Agric. Food Chem.* 29(2); 1981; 340-3

COTTONSEED

105 REBER (EF) and PYKE (RE). Sub-acute toxicity studies of glandless cottonseed kernels fed to rats. *J. Food Safety*. 2(2); 1980; 87-95

Glandless cottonseed kernels were fed as raw, cooked or roasted ground flours. The glandless cottonseed flour (20%) was added to laboratory chow (80%). The control was lab chow (94%) plus cottonseed oil (6%). Sexually mature rats (F-0) were fed the diets for two weeks prior to being bred, and through lactation, From their offspring (F-I), 50 males and 50 females were selected from each group. The F-1 rats were fed the diets from weaning until 24 weeks of age. At 13 weeks of age, the rats were bred, and their offspring (F-2) were raised to weaning. There were no statistically significant differences due to treatment in the number of litters born, litter size, or weights of the young of the F-0 or the F-1 females. Growth and food consumption were similar for F-1 rats in all treatments. There were no detrimental effects due to feeding glandless cottonseed kernels. AA

SUNFLOWER

106 THOMPSON (TE), ROGERS (CE) and ZIMMERMAN (DC). Sunflower oil quality and quantity as affected by *Rhizopus* head rot. *J. Am. Oil Chem. Soc.* 57(3); 1980; 106-8

Sunflower seed (*Helianthus annus*. L.) from plants infected with head rot caused by *Rhizopus* spp. exhibited serious oil quality problems. Free fatty acid content of this oil was 19.4% compared with 0.8% for oil from seed of healthy plants. Oil from diseased seed was also higher in palmitic, stearic, arachidic, behenic and lignoceric fatty acids. In addition, diseased plants yielded only 81% as much seed and only 55% as much oil. AA

107 SCIANCALEPORE (V) and DORBESSAN (W). The sterol fraction of sunflower seed oil and its modification during the process of refinement. Note 3. *Ind. Aliment.* 19(171); 1980; 316-20 (Italian)

Gas chromatography of sunflower oil (using 1.5% OV-17 as the liquid phase) reveals that the sterol fraction of the oil has a complex composition, with campesterol, stigmasterol, Δ7-campesterol, β-sitosterol, Δ5-avenasterol, Δ7-stigmasterol, and Δ7-avenasterol as the main components. During refining, the sterol fraction, which initially amounts to 0.23-0.33%, falls to 0.16-0.26% (w:w). The decrease occurs mainly during the chemical neutralization step. The ratio of the sterols, *inter se*, changes remarkably during decolourization, the contents of Δ5-avenasterol, Δ7-avenasterol, and Δ7-campesterol being drastically reduced. KMD

PECAN

108 HORVAT (RJ) and SENTER (SD). Identification of some volatile products from mildly oxidized pecan oil. *J. Am. Oil Chem. Soc.* 57(3); 1980; 111

TUBERS AND VEGETABLES

POTATO

109 MAGA (JA). Glycoalkaloid stability during the extrusion of potato flakes. *J. Food Process. Preserv.*4(4); 1980; 291-6

Potato contains a toxicant glycoalkaloid (TGA), like α-solanine and α-chaconine. Acceptable upper limit of TGA is 20 mg/100 g of raw potatoes. No apparent losses in TGA were noted with high moisture level formulations over an extruder temperature range of 70-160 C under certain formulation and extruder operations. TGA destruction could be due to physical shearing as well as possibly by thermal degradation. Another possible reason may be the concentration effect of reactants due to the lowering of the water content at a high water activity. BSN

110 BERGERS (WWA). On the colour reactions of potato glycoalkaloids in strong acids in the presence of paraformaldehyde. *Food Chem.* 6(2); 1980; 123-31

The colour reaction of potato glycoalkaloids, containing solanidine as steroid, with strong acids and paraformaldehyde was examined to elucidate the kinetics and mutual relationship of the 'Clarke' and 'Marquis' reactions. It was found that the influence of time of addition of paraformaldehyde was the major factor in deciding the type of colour changes encountered. This factor and the specific absorption kinetics have important consequences for the use of these types of colour reactions as a quantitative assay. According to the structural similarity of the steroidal part of potato glycoalkaloids and cholesterol, colour reactions of both have been compared, indicating that both steroids react in strong acids in the presence of an oxidator, provided that the more lipophilic character of cholesterol is taken into account. Therefore a similar mechanism of a serial oxidation of carbonium ions as in the case of cholesterol, is suggested as the basis for these specific colour reactions of potato glycoalkaloids. AA

VEGETABLE

111 OSTROWSKI-MEISSNER (HT). Protein degradation in herbage extracts during membrane filtration process: The effect of reducing agents addition. *J. Food Process. Preserv.* 4(4); 1980; 261-79

In protein extraction, a substantial reduction of protein recovery was observed when membrane filtration technique was used for concentration of herbage extracts. Changes in enzyme activity were measured by the photochemiluminescence technique. While amino N_2 was determined using ninhydrin method. Protein concentration at 0 C reduced protein degradation without enzyme deactivation simultaneously decreasing the filtration action. Addition of vitamin C prevented losses in extracts processed at 28 C as compared to process conducted at 0 C. With 1% ascorbic acid and 2% sodium sulphite, higher methionine content was obtained. BSN

112 SADOVSKI (AY) and FARBER (A). *Streptococcus faecalis* and *Streptococcus faecium* in frozen vegetables. Incidence and survival after treatments commonly used at the vegetable freezing plants. *J. Food Safety.* 2(2); 1980; 59-73

Streptococcus faecium predominated in fresh vegetables which were not irrigated with sewage treatment plant water. Vegetables which were irrigated with waste water from a sewage treatment plant contained equal numbers of the two species. *S. faecium* survived the effect of chlorination better than *Streptococcus faecalis*. The tendency for chain aggregate formation was more prominent in *S. faecalis* especially during exponential growth. This affected the recoveries after freezing but not after the chlorination treatment. With exponential cultures which were treated for aggregate dispersal and with stationary cultures, *S. faecium* survived the effect of freezing better. This indicates a higher resistance of this organism and that the vegetable treatments in the freezing plant may result in a relative enrichment in *S. faecium*. Thus, enterococcal count in frozen vegetables is comprised to a large extent of this group, a fact which reduces the significance of the enterococci as a sanitary indicator. A specific *S. faecalis* count may be a better indicator of the sanitary quality of frozen vegetables and may be performed with KF agar supplemented with 0.04% K_2TeO_3. AA

ALFALFA

113 FLORENTINE (R), PISANELLI (AM), LENCIONI (L) and GALOPPINI (C). Pilot plant production of edible leaf protein concentrates. II. Chemical evaluation of the products. *Ind. Aliment.* 19(170); 1980; 220-3 (Italian)

Chemical composition of the products obtained by a pilot scale wet fractionation process from alfalfa is reported. The pilot plant, described in a previous paper, gives two feed-grade products (press cake and chloroplastic protein concentrate) and two edible leaf protein concentrates obtained by heat and acid coagulation of the cytoplasmatic protein fraction. Results show that the press cake is still rich in nutrients to be used for ruminants without nitrogen integration. The green concentrate shows a protein, vitamin and pigment content high enough for the feeding of non-ruminant in general and poultry in particular. As for the cytoplasmatic concentrates, the high protein content and the valuable aminoacid composition make them suitable for human consumption, particularly the product obtained by acid coagulation, which also shows high nitrogen solubility. AA

114 RAMBOURG (JC) and MONTIES (B). Fluorimetric and densitometric determinations of coumestrol, applied to quality control of alfalfa leaf proteins. *Ann. Technol. Agric.* 29(3); 1980; 463-75 (French)

The characteristic absorption and fluorescence spectra of coumestrol allow its fluorimetric determination in solution. After thin-layer chromatographic separation and elution, linear fluorimetric responses were obtained in the range of 0 to 250 mg per spot. Coumestanes and coumestrol, occurring in alfalfa leaf proteins, were estimated either after progressive elution with solvents and fluorimetry in solution, or after phase partition or thin-layer densitometry. KMD

TOMATO

115 LEONI (C), BOLZONI (L) and ALDINI (R). Holding of crushed tomatoes before refining and concentration: Effects of the consistency of the concentrate produced as a function of the tomato varieties used. *Ind. Conserve.* 56(1); 1981; 10-3 (Italian)

Holding was found to have a favourable effect on the consistency of the concentrates obtained from varieties with a high initial content of pectic substances (i.e. varieties suitable for mechanical harvesting) whereas it scarcely affected consistency in the case of conventional varieties. The effect, even if positive, proved to be remarkably smaller than that obtained with thermal activation of pectolytic enzymes (hot-break technique). Holding affected normal pectolysis mechanisms, and, consequently, high amounts of metallic pectinates were formed. KMD

116 MAGUIRE (YP), SOLBERG (M) and HAARD (NF). Influence of atmospheric oxygen and ozone on ripening indices of normal (rin) and ripening inhibited (rin) tomato cultivars. *J. Food Biochem.* 4(2); 1980; 99-110

Ethylene (10 ppm) dependent mediation of normal and mutant (rin) tomato fruit ripening was promoted by 100% oxygen, 3.7 pphm ozone, or their combination. All ripening indices studied (respiration, chlorophyll degradation, carotenoid accumulation, softening, and aroma development) were promoted by oxygen and/or ozone. Ozone also acted independent of ethylene in promoting chlorophyll degradation and aroma development in normal fruit, but did not appreciably affect these quality attributes in mutant fruit. Lycopene accumulation in normal and mutant fruit and aroma formation in normal fruit were promoted to a greater extent by ozone than were other ripening indices. Mutant (rin) fruit contained 27% of the lycopene that was present in normal (Rin) fruit after ripening in O_2 containing 10 ppm ethylene and 3.7 pphm ozone, whereas they contained only 3% of the lycopene in normal fruit after ripening in air containing 10 ppm ethylene. AA

CUCUMBER

117 SCIUMBATO (GL) and HEGWOOD (CP) Jr. A rapid method of evaluating and determining length of activity of surface applied fungicides for the control of cucumber fruit rot. *Hortsci.* 15(3); 1980; 254-5

Fruit of cucumber (*Cucumis sativus* L.) and sterile seed of beet (*Beta vulgaris* L.) were placed on soil infested with *Rhizoctonia solani* kuhn after treatment with soil-applied fungicides. Several fungicides gave acceptable fruit rot control 7 days after spraying on soil surface but none gave acceptable control after 13,21 or 29 days. In general, the percent of beet seed infested with *Rhizoctonia* increased 13,21 and 29 days after spraying. AA

MUSKMELON

118 WELLS (JA) and NUGENT (PE). Effect of high soil moisture on quality of muskmelon. *Hortsci.* 15(3); 1980; 258-9

Soil moisture was negatively correlated with soluble solids content (SSC) in muskmelon and negatively correlated with dry matter, ascorbic acid, β-carotine and sucrose content SSC was highly correlated with ascorbic acid, sucrose, and dry matter content. KAR

FRUITS

119 NAVILLE (R). Progress report on tropical fruits and citrus imports into France during the period 1975-1980. *Fruits*. 36(3); 1981; 189-200 (French)

French imports of tropical and citrus fruits during the six-year period increased at the rate of 1% per annum, on the whole. The consumption of bananas, oranges, and mandarins decreased; the import of pineapples increased from 1975 to 1979, but suffered a fall in 1980. The import of avocados also declined because of unfavourable climatic conditions in Israel. However, the imports of mangoes, papayas, limes, tangeloes and other small citrus fruits increased, and showed a more promising trend. Efforts should be made to increase production and improve distribution, in order to satisfy the consumer. KMD

120 HUET (R). VIII International Essential Oils Congress, Cannes-Grasse, 12-17 Oct. 1980. *Fruits*. 36(1); 1981; 53-5

Abstracts of the following 12 papers have been reported. Teisseire (P) - Activities of the Scientific and Technical Commission of PRODAROM; McHale (D) - Effect of production conditions on the composition of the distilled essential oil of lime; Haro Guzman (L) - Essential oils of Mexican limes. Changes in composition due to the technique of extraction; Naganuma (N) et al. - Studies on the phytotoxicity of citron essential oil; Whitfield (FB) - Volatile, odorous components of passion fruits; Whitfield (FB) - Volatile, odorous components of avocadoes; Hartmann (VE)- New, natural antioxidants for limonene and citrus essential oils; Cheng (Y-S) et al - Essential oil from the leaves of citrus species in Taiwan; Chayet (L) et al - Mechanism of enzymatic biosynthesis of terpenes in the essential oils of citrons; Awad (MA) - Essential oil from the peel of oranges grown in Egypt; Matsuura (Y), et al - A new macroline with 13 chains. Odour component of the essence of Yuzu (*citrus junoz*); and Shankaracharya (NB) et al - Researches on the deterpenation of citrus essential oils. KMD

121 FERNANDEZ (RH), COOKE (RD), QUIROS (RM), MADRIGAL (LS), SAMUELS (AD), AQUILAR (FV) and ORTIZ (AN). Fruit and vegetable processing and appropriate technology in Costa Rica: A case study. *Trop. Sci.* 22(2); 1980; 149-58

Two, small, food-processing plants run by agricultural co-operatives, and established in different climatic zones of the Costa Rica, have been described. They have helped to evaluate market constraints on the different fruits and vegetables, and their processed products. The small farmers are now less dependent on the vagaries of the fresh produce marketing system; rural employment has been increased, while agronomic inputs and post-harvest handling have improved. Products manufactured are whole

peaches in syrup, pickles in vinegar or mustard sauce, sauerkraut, and chiverre "honey" (a popular local jam). Two more plants are being planned: one in the Atlantic, tropical lowlands to process tropical roots and spices; and the other in the Northern, Pacific zone for to process cashew and macadamia nuts, mangoes, guavas, milk, and cheese. KMD

122 ESPIARD (E). Equipment and procedures in the fruit and vegetable transforming industries. *Ind. Alim. Agric.* 97(3); 1980; 143-8 (French)

The fruit and vegetable industries appear to have good prospects for development in both temperate, and tropical or equatorial countries. It is high time for those industries, like most other agricultural and food industries, to be considered as full-time industries. France is in a good position to keep pace with such a development, provided it can overcome the handicap relating to manufacture of equipment, especially packaging equipment. The mechanical and electrical industries should put in the necessary effort, which is likely to prove highly profitable. KMD

123 ALDINI (R), LEONI (C) and ZANOTTI (A). Use of anode-stripping voltammetry for the determination of trace levels of lead in canned fruit and vegetable products. *Ind. Conserve.* 56(1); 1981; 18-21 (Italian)

The anode-stripping voltammetry technique of lead determination is as accurate as, but quicker than the existing polarographic and spectrophotometric procedures, since preliminary digestion of the sample can be dispensed with. Analysis of 336 samples, 6-18 months old, showed that lead level exceeded 0.5 ppm in only 4.4% of the samples. The highest Pb concentrations were found in 100-, 200-, and 300-g cans, while larger cans had lower concentrations of Pb. KMD

STRAWBERRY

124 COURTER (JW), SABOTA (CM) and NYANKORI (JCO). Methods of surveying direct market customers. *Hortsci.* 15(3); 1980; 265-6

The experience gained from three surveys of direct market strawberry customers in Illinois is discussed. KAR

125 DIRINCK (PJ), De POOTER (HL), WILLAERT (GA) and SCHAMP (NM). Flavour quality of cultivated strawberries: The role of the sulphur compounds. *J. Agric. Food Chem.* 29(2); 1981; 316-21

For determination of the importance of the different aroma components for strawberry flavour at several times, different varieties of strawberries were organoleptically evaluated for flavour intensity and quantitative GC-MS analyses were performed. Interpretation of the results consisted of correlating the organoleptic data with the concentrations of the flavour components, representatively isolated by headspace concentration on Tenax. In some comparisons significant sensory flavour intensity data could be related to the sum of the concentration of the volatiles, released when macerating the fruits. In other cases, especially with "older" varieties, the difference in amount of sulphur-containing compounds which compared to the esters were present at a much lower concentration, had to taken into account. The methylthiol acetate and methylthiol butyrate, are reported for the first time in strawberries. AA

126 IWATA (Y), DINOFF (TM), BAILEY (JB), VOTH (V) and GUNTHER (FA). Analytical method for nitrapyrin and 6-chloropicolinic acid residues in strawberry fruit and soil. *J. Agric. Food Chem.* 29(2); 1981; 235-9

PINEAPPLE

127 CROCHON (M), TISSEAU (R), TEISSON (C) and HUET (R). Effect of a pre-harvest application of ethrel on the organoleptic quality of pineapples grown on the Ivory Coast. *Fruits*. 36(7-8); 1981; 409-15 (French)

Application of ethrel on pineapples, shortly before harvest, enables one to accelerate, and, above all, homogenize, the orange colouration of the fruit. Observations made after the fruit had been transported to France showed how important it is to pick the right date for ethrel application. If ethrel is applied on the theoretically determined first day of harvest, the result is beneficial; but if it is applied a little too early, then the organoleptic quality of the fruit is affected: less sugar, more acid, and unsatisfactory to the consumer. KMD

GRAPE

128 PHATAK (SC), AUSTIN (ME) and MASON (JS). Ethephon as harvest-aid for muscadine grapes. *Hortsci.* 15(3); 1980; 267-8

(2-Chloroethyl) phosphonic acid (ethephon) was applied at 0, 570,1000 and 2000 ppm to muscadine grapes (*Vitis rotundifolia* Mich, cv. Hunt), 1,2,or 3 days before once-over harvest. All ethephon treatments increased berry abscission and reduced skin tear due to harvest when berries were harvested 2 days or 3 days after spraying. Delaying harvest to 3 days after treatment with 2000 ppm ethephon increased berry abscission to 46% and reduced skin tear to 9% in 1977. In 1978, 2000 ppm of ethephon increased berry abscission to 29% and reduced skin rupture to 29%. Taste panels could not detect flavour difference from the ethephon treatments. AA

CITRUS

129 LUND (ED), KIRKLAND(CL) and SHAW (PE). Methanol, ethanol and acetaldehyde contents of citrus products. *J. Agric. Food Chem.* 29(2); 1981; 361-6

The three major citrus volatiles methanol, ethanol, and acetaldehyde were quantitatively determined for various citrus products by gas chromatography. Methanol concentrations varied from 10 to 80 ppm, ethanol from 90 to 900 ppm, and acetaldehyde from 50 to 190 ppm (w/v). Correlations were examined between composition of volatiles and storage history or other quality factors. A positive correlation was observed between methanol content and storage time of canned grapefruit sections and between ethanol content and storage time of non-heat-treated, glass-packed grapefruit sections. Composite data for all single-strength juices (fresh and processed) showed that acetaldehyde concentration was higher and ethanol and methanol concentrations were lower in grapefruit than in orange juice. Similarly, reconstituted commercial

concentrates contained less methanol and ethanol and more acetaldehyde than single-strength juices. Similarity between the profiles of volatiles for some concentrates and the profile for single-strength juice suggested that these concentrates contained essence. Volatiles in single-strength juice did not correlate with Brix, acid pulp, or storage history, but a possible relationship between ethanol and the processing date for orange juice was found. Some of these correlations might be useful in quality evaluation. AA

LEMON

130 TATEO (F) and NULLI (G). Effects of heat treatments on some characters of lemon essential oils. *Ind. Aliment.* 19(170); 1980; 216-9 (Italian)

Lemon oil was heated at temperatures between 100 and 150 C, for periods extending up to 60 minutes, and the variations in colour, in the peroxide value, and in certain parameters obtained by GLC were observed. Significant changes in the absorption spectrum of visible light were noticed; these changes viz. marked reductions in optical density increased with the temperature and time of treatment. The peroxide index increased with the temperature and duration of heat treatment. The heat treatment also altered the ratio of the areas of the two peaks a and b. Peak a increased appreciably with the intensity of heat treatment. KMD

ORANGE

131 ALBACH (RF), REDMAN (GH) and LIME (BJ). Limonin content of juice from marrs and hamlin oranges (*Citrus sinensis*(L) Osbeck). *J. Agric. Food Chem.* 29(2); 1981; 313-5

TLC analysis of heated orange juice from oranges extracted at 2-week intervals (as in commercial processing so that delayed bitterness due to limonin formation from its tasteless precursor, limonate A-ring lactone would develop maximally) showed that average limonin content of 6.2 ppm in September declined to as low as 1.2 ppm in January. Linear correlations between limonin and harvest time was much better than between limonin and ^{o}Brix, percent acid, or the ^{o}Brix/acid ratio. BSN

BERGAMOT

132 HUET (R). Comparative study of bergamot essential oil coming from Italy, Corsica, and the Ivory Coast. *Fruits.* 36(6); 1981; 385-93 (French)

The characteristics of bergamot essential oil vary widely with the climate, and the geographical location of the bergamot plantations. Bergamot oils of Mediterranean origin had a higher content of some terpenes like α- and β-pinene, sabinene, and γ-terpinene, while the oil originating from the Ivory Coast had a higher content of linalool. Two constituents, X_1 and X_2, are specific for the bergamot oil of Mediterranean origin. The UV spectra of the two types of bergamot oil are also different, and these differences become obvious even on the olfactory plane. KMD

AVOCADO

133 VUILLAUME (C),and MOREAU (B). Some preliminary observations on the collection of avocado trees at the Basse-Martin Station in Reunion. *Fruits*. 36(3); 1981; 139-50

A detailed report has been presented on the cultivation of different varieties of avocado trees at the Basse-Martin Station. It covers flowering and fruit-setting, production periods, determination of maturity, fruit production over a period of 7 years, yields, improvement in average weight of the fruits, and plant protection problems. The avocado is a very interesting fruit, on account of its contents of protein, oil, water-soluble and fat-soluble vitamins, and mineral salts which make it very nutritive. It is a complete and digestible food with satiating properties. KMD

PAPAYA

134 MacKENZIE (RA) and STRACHAN (G). Possibilities for processing mountain papayas in New Zealand. *Food Technol. NZ*. 15(8); 1980; 13,19

Mountain papayas have been shown to be very suitable for processing. The pleasant aroma and attractive colour are both stable to heating or for prolonged storage. Fruit nectar is a particularly attractive product of this fruit. KAR

SUGAR, STARCH AND CONFECTIONERY

135 FINZI (M). Dietetic and therapeutical value of beehive products. *Ind. Aliment*. 19(171); 1980; 321-30 (Italian)

The author has reported in detail, the various chemical constituents of honey; carbohydrate, protein, lipids, water, ash, vitamins, minerals, oligoelements (or trace minerals). He has also given the mineral compositions of clear and turbid honey, and described the inhibitory effect of honey on *B. coli*. The composition of royal jelly has been given in detail, as also its biological effects. The proximate composition of pollen has also been given. KMD

136 WEN-PIN CHEN. Glucose isomerase (a review). *Process Biochem*. 15(6); 1980; 36-42

Glucose isomerase catalyzes the reversible isomerisation of glucose to fructose. The enzyme is used for the commercial production of high fructose corn syrup. This paper reviews production, extraction, purification, properties and immobilization of glucose isomerase. Glucose isomerase from various organisms and its chemical and enzymatic properties have been studied. The catalytic activity of the enzyme with various metal ions is discussed. Kinetic and magnetic resonance studies on the mechanism of glucose isomerase have been carried out. Extraction of glucose isomerase from organisms with cationic detergents is simple, inexpensive and efficient. Glucose isomerase is usually prepared in the form of immobilized cells since they are stable. BSN

137 ROLZ (C). A new technology to ferment sugar cane directly: The Ex-ferm process. *Process. Biochem.* 15(6); 1980; 2-6

BAKERY PRODUCTS

BREAD

138 WOOD (PS). Recent advances in bread improvers. *Process Biochem.* 15(6); 1980; 12-6 and 32

Discusses: composition of improvers (oxidants and reducing agents; soya flour fats and emulsifiers) and developments. BSN

139 CLARKE (PA), SIM (ES) and TAN (D). The use of sago flour in bread-making. *Trop. Sci.* 22(2); 1980; 189-95

Trials in a laboratory and in a field kitchen have proved that it is possible to substitute about 10% of the wheat flour with sago flour (*Metroxylon sagus*) in breadmaking by fermentation methods, without significantly reducing bread quality. There would be a small reduction in the protein content of the loaf. KMD

140 ALNAJI (LK) and KADOUM (AM). Note on the effects of baking on methyl phoxim and malathion residues in bread. *Cereal Chem.* 58(1); 1981; 74-5

The studies have shown that methyl phoxim penetrated into the kernel, as the residue level rose by the seventh and fourteenth day inspite of degradation. Malathion also showed similar trend at the end of 14th day storage of the flour. Methyl phoxim and malathion residues during baking were degraded from 79.1 to 100.0% and 80.1 to 100% respectively. No effect on bread volume, crumb colour, grain and structure were observed either with methyl phoxim or malathion treated wheat flour. BSN

COOKIE

141 LINGNERT (H). Antioxidative maillard reaction products III. Application in cookies. *J. Food Process. Preserv.* 4(4); 1980; 219-33

Storage stability of the cookie is affected by the addition of histidine and glucose as well as Maillard reaction products (MRP) from histidine and glucose. Basic type of cookie containing lard and vegetable fat was chosen for the study. The different additions used were BHA/BHT, histidine and glucose, MRP from histidine and glucose. During storage period at 30 C, samples were withdrawn for sensory evaluation and for gas chromatographic analysis of volatile compounds. Lard containing cookies were the least stable of the two types rancid flavour was retarded by the addition of histidine. Cookies with vegetable fats also showed the same result. MRP formed during baking served as an antioxidant BSN

MILK AND DAIRY PRODUCTS

142 GREGORY (K). New dairy process using lactase. *Food Process. Ind.* 49(589); 1980; 44-6

Discusses: sweetness without sugar; properties of hydrolact; use of lactose; and ice cream. BSN

143 GODFREY (RE). Effluent treatment and water recycling in the dairy industry. *Food Process. Ind.* 49(589); 1980; 31,35,37

Discusses the biospiral system based on rotating disc spiral principle for achieving economy in recycling of effluent treatment and water recycling in dairy industry. BSN

144 SINHA (N). Reverse osmosis (RO) and ultrafiltration (UF) processes. Their differential features and applications in the dairy industry. *Indian Dairyman.* 33(5); 1981; 323-7

Some salient features of reverse osmosis (RO), and ultrafiltration (UF) are described. The applications of RO for concentration and fractionation of liquid dairy products and of UF for yoghurt and cheese manufacture are outlined. MVG

145 YUCEER (S) and GUNDUZ (G). Preservation of cheese and plain yoghurt by low-dose irradiation. *J. Food Prot.*43(2); 1980; 114-8

Irradiation of Turkish kashar cheese and plain yoghurt with a 0.15 Mrad dose of Co-60 radiation produced no side effects. The number of bacteria killed increased sharply upto a level of 0.02 Mrad; thereafter, the effectiveness of the dose decreased. Coating cheese samples, with a sorbic acid solution helped to reduce the number of bacteria by about 10-12% in irradiated samples. The shelf-life of irradiated samples stored under refrigeration was the same as that of samples coated with sorbic acid and stored at room temperature. Mould formation took 3-4 times longer in irradiated samples than in non-irradiated samples. In the case of plain yoghurt the effect of total dose was the same as in cheese. Irradiation increased the shelf-life of yoghurt three-to four-fold. Irradiation combined with refrigeration increased the shelf-life about five-fold. KMD

MILK

146 KAUL (A), PRASAD (C) and SINGH (RS). Problems of residual antibiotics in milk. *Indian Dairyman.*33(5); 1981; 329-34

Entry of antibiotics into milk, effect of residual antibiotics on lactic acid bacteria, and methods of detection of residual antibiotics are the aspects covered in this article. MVG

147 SEN (LC), LEE (HS), FEENEY (RE) and WHITAKER (JR). *In vitro* digestability and functional properties of chemically modified casein. *J. Agric. Food Chem.* 29(2); 1981; 348-54

BUTTER

148 PRECHT (D). Studies on the crystal structure and the molecular conformation of the fat phase of butter. *Fette Seifen Anstrichm.* 82(4); 1980; 142-7 (German)

Comparative examinations of butter samples are carried out at different temperatures of preparation, ranging from 15 to 35 C by means of electron microscope pictures obtained by freeze fracturing technique and of X-ray diffraction patterns. At 35 C, practically all fat globules and crystals are in the interglobular fat phase of butter melt. It is concluded that in the region of the outer globule shell as well as in the region of the crystal platelets of the water droplets the triclinic β modification dominates. In contrast to this fact, the predominating part of the β modification is to be found in the deeper melting crystal layers of the interior of the globules. VR

MEAT AND POULTRY

149 BAIER (A) and HOPFNER (W). Rationalization of transport, handling and warehousing in meat processing. I. Determination of the crucial points and influencing factors in the transport, handling, and storage processes. *Fleisch.* 33(4); 1979; 66-8 (German)

150 ZOPHEL (K-H). Mechanized transport of cardboard boxes. *Fleish.* 33(4); 1979; 69-71 (German)

151 CHVAPIL (M), ULREICH (JB) and HUNTER (B). Complementation of predigested proteins: A nutritionally and economically advantageous method of by-products utilization. *J. Nutr.* 110(7); 1980; 1319-26

Proteins isolated from animal by-products like bovine skin trimmings, sheep wool, whole bovine blood and inedible chicken carcass were complemented with casein and soy proteins and protein quality was listed on the growth of *Tetrahymena pyriformis*. It was observed that complementation of animal by-products protein is a nutritionally and economically advantageous method. KAR

152 MOHR (V). Enzymes technology in the meat and fish industries. *Process. Biochem.* 15(6); 1980; 18-21 and 32

The application of enzymes in meat and fish industries is reviewed. Commercial proteases are used in meat tenderizing, while plant proteases and microbial proteases are used in fish protein preparation. True collagenases are highly specific proteases acting on native and denatured collagen by weakening the connective tissue. Plant endopeptidases are generally more effective in solublizing fish proteins than highly specific proteases of animal origin. Autolysis as an industrial method is recommended since it offers good possibilities for utilizing waste materials in the meat industry. BSN

153 FRITZ (W) and UHDE (W-J). On the formation of N-nitroso compounds in foods. *Ernahrungsforschang.* 24(6); 1980; 181-4

N-nitroso compounds can be produced in animal foods by technological measures (smoking), or preparation processes (roasting), or by bacteria (e.g. in fish). One must also consider the possibility of their transfer from animal feeds (fish meal, silage) into animal foods. Other sources of nitrosamines may be over-fertilization with nitrogen, as also nitrosated pesticides. KMD

154 BOUSSET (J). Determination of nitrite and nitrate in meat products. *Ann. Technol. Agric.* 29(3); 1980; 415-36 (French)

Two methods, one manual and one automatic, have been described. The manual method enables determination of nitrite at a minimum concentration of 2.5 mg $NaNO_2$/kg fresh product, with an accuracy of 2%, and of nitrate at a minimum concentration of 5 mg KNO_3/kg fresh product, with an accuracy of 7%. Sampling errors have been omitted from this reckoning. With the automatic method, the accuracy exceeded 2%. The range of measurement was 1 to 10 for each sample/diluent ratio, and 1 to 1500 for all ratios. The threshold of detection was about 1 mg $NaNO_2$ or KNO_3 per kg of fresh product. KMD

155 LENGERKEN (GV), LENGERKEN (JV) and EGGERS (G). A new method of determining crude protein in meat and meat products. *Fleisch.* 33(4); 1979; 76-7 (German)

A new method to determine crude protein is described. This is based on a quick mineralization followed by hypobromite titration with dead stop indication. In the case of meat, the results with regard to accuracy and reproducibility are the same as in the conventional kjeldahl's process. This new method can be carried with less time consumption and costs. No significant differences in results between the two methods are noticed. VR

156 BALDINI (P). The problem of additives in meat products : I. nitrites. *Ind. Conserve.* 56(1); 1981; 26-32 (Italian)

The role of nitrates and nitrites in meat products - both as inhibitors of *Clostridium botulinum*, and as precursors of nitrosamines - has been outlined. Only heat-sterilized meat products and some fermented meat products are traditionally prepared without the addition of nitrite and nitrate. In the case of products pasteurized at high a_w- and pH-values, the absence of botulinum toxin can only be assured by rationalization of the storage conditions, and by a study of processing techniques which can introduce additional safety factors. KMD

157 BOUSSET (J). Proteolysis during storage at 22 C, after gamma irradiation of axenic animal muscle (*Rattus rattus*) with or without nitrite or nitrate addition. *Ann. Technol. Agric.* 29(3); 1980; 437-46 (French)

The effect of γ-irradiation at 10,30, and 50 KGy on proteolysis during storage was studied, using axenic animal (rat) muscle, thereby avoiding any bacterial action. Irradiation even at the high dose of 50 KGy did not produce any favourable, i.e. inhibitory, effect on the overall proteolysis. For preservation of food, especially fresh or brined meat, a heat treatment should be combined with γ-irradiation to inactivate the proteases. KMD

158 CANTONI (C), PALEARI BIANCHI (MA), BERETTA (G) and PERLASCA (M). Colour of dry salami. *Ind. Aliment.* 19(170); 1980; 214-6 (Italian)

159 BRYAN (FL). Foodborne diseases in the United States associated with meat and poultry. *J. Food Prot.* 43(2); 1980; 140-52

BEEF

160 VALIN (C) and LACOURT (A). Comparative study of different methods of conditioning minced and refrigerated beef. *Ind. Aliment. Agric.* 97(3); 1980; 123-9 (French)

The rate of carcass cooling plays a decisive role in the development of the contaminating microbial flora of refrigerated beef mince. For given conditions of refrigeration, however, the method of conditioning minced meat permits us to modify the growth characteristics of the contaminating flora, and to improve the duration of life of the colour of these products. Thus, conditioning of minced meat under CO_2-O_2 enables us to double the life, as compared to simple packaging in a film permeable to air. Packaging under vacuum results in a noteworthy prolongation of the period of conservation under refrigeration, as the re-oxidation of myoglobin is still very rapid after 15 days of conservation under vacuum. KMD

PORK

161 ETHERTON (TD) and ALLEN (CE). Effects of age and adipocyte size on glucose and palmitate metabolism and oxidation in pigs. *J. Ani. Sci.* 50(6); 1980; 1073-84

162 LINGNERT (H) and LUNDGREN (B). Antioxidative maillard reaction products IV. Application in sausage. *J. Food Process. Preserv.* 4(4); 1980; 235-46

Effect of (Maillard reaction products) MRP on the oxidative stability of sausage during frozen storage was studied. Sausage of the frankfurter type was made from batter containing a) no addition; b) 0.08% MRP from histidine and glucose; c) 0.16% MRP from histidine and glucose; d) 0.08% histidine + 0.32% glucose; e) 0.16% histidine + 0.32% glucose and f) 0.16% MRP from an enzymic hemoglobin hydrolysate and glucose. Sausages were wrapped in aluminium foil and stored at -20 C. Rancid flavour was retarded in sausages containing MRP. No effect was obtained by the addition of few histidine and glucose. Sensory changes during storage was neither related to the concentration of volatiles nor to the peroxide value. The concentration of n-hexanal alone showed some correlation with the sensory evaluation results. BSN

163 VARNADORE (WL), REAGAN (JO) and CARPENTER (JA). Influence of initial ham quality and physical dimensions on processing yield. *J. Ani. Sci.* 50(6); 1980; 1061-6

Objective physical measurements and subjective quality scores were obtained on 348 hams to determine the predictability of chilled processed weights and overall processing yields. Analysis of variance and regression analysis were performed to determine the values of these measurements and scores. Hams with darker coloured lean, greater fat thickness at the skin-collar interface and smaller specific gravity coefficients produced higher percentages for overall product yield. Muscle colour, average fat depth of collar (AFD) and specific gravity exhibited the highest correlation coefficients with yield (.36, .35 and -.32, respectively), AFD was correlated with specific gravity (-.66). Chemical fat also was highly correlated with specific gravity (-87). Multiple

regression equations using objective and subjective measurements predicted 25% of the total variation (best five variables) in overall yield, with colour, the best single predictor (13.7%). Physical measurements alone accounted for approximately 16% of the total variation in overall yield. The best single objective predictor was AFD in the cushion region. Chilled weight of the final ham product could be predicted with a coefficient of determination of 89.9% with the independent variables green weight, muscle colour score, AFD, total ham length and specific gravity coefficient. The higher coefficients of determination for chilled weight than for predicted yield may be partially accounted for by a lesser degree of compounded error in the chilled weight term. AA

RABBIT

164 YASUI (T), ISHIOROSHI (M) and SAMEJIMA (K). Heat-induced gelation of myosin in the presence of actin. *J. Food Biochem.* 4(2); 1980; 61-78

POULTRY

165 MURRAY (DB) and MITCHELL (MS). Outline of the poultry industry in Canada. *World Poult. Sci. J.* 36(3); 1980; 174-84

Discusses: industry structure; production; marketing; research and extension; and international trade. BSN

166 JANTAWAT (P) and DAWSON (LE). Composition of lipids from mechanically deboned poultry meats and their composite tissues. *Poult. Sci.* 59(5); 1980; 1043-52

The fatty acid components of the phospholipids from mechanically deboned chicken meat (MDCM) and mechanically deboned turkey meat (MDTM) more closely resemble the fatty acid of their corresponding bone or hand deboned meat phospholipids than skin phospholipids. The cholesterol content of MDCM and MDTM lipids resembled more closely that of skin lipids or bone lipids than muscle lipids. KAR

167 JANTAWAT (P) and DAWSON (LE). Effects of inert gas and vacuum packagings on storage stability of mechanically deboned poultry meats. *Poult. Sci.* 59(5); 1980; 1053-8

Mechanically deboned chicken and turkey meats (MDCM and MDTM) were individually mixed under inert atmospheres, packaged with N_2 or CO_2 gases or under vacuum and frozen at -18 C immediately after packaging or after holding for 72 hours at 4 C. Vacuum and N_2 packaged samples from most treatments gave significantly higher unsaturation ratios and lower TBA numbers than CO_2 packaged samples of corresponding treatments. Vacuum and N_2 packaged samples showed similar development of TBA reactive substances. Significantly higher losses of polyunsaturated fatty acids and increases in TBA numbers were found in all samples which were held at 4 C for 72 hours before freezing. KAR

168 LYON (CE). Effects of flake-cutting, seasoning, and structured protein fibre on mechanically deboned poultry meat. *Poult. Sci.* 59(5); 1980; 1031-5

Quality characteristics like moisture and fat, water holding capacity, percent moisture retention, cooked yield, retention of water and fat and textural properties of mixed and flake-cut mechanically deboned poultry meat alone, with seasoning, with SPF and with both seasoning and SPF were evaluated. Percentage of moisture retained was significantly higher in patties made with flake-cut than with mixed meat. Addition of 1% seasoning (salt, pepper, sage, coriander, and dextrose) significantly increased percentage of moisture retained and cooked yield and significantly decreased hardness and areas under the compression curves. Addition of 15% structural protein fiber to the meat significantly increased springiness, cohesiveness, and chewiness. The combination of seasoning and structural protein fiber significantly increased cooked yield, retention of water and fat, and percentage of moisture retained. KAR

169 PRIOR (MG), O'NEIL (JB) and SISODIA (CS). Effects of ochratoxin A on growth response and residues in broilers. *Poult. Sci.* 59(6); 1980; 1254-7

The effects of continuous feeding of graded levels (.5,1.0, 2.0 ppm) of ochratoxin A (OA) for eight weeks to male and female broiler chickens were investigated. A depression in body weight gain was observed in all groups receiving OA. The depression was proportional to the level of exposure to OA and was more marked and prolonged in males than in females. Detectable residues of OA were observed in the liver and kidney of birds fed 2 ppm OA. Residues disappeared from liver with 24 hour and from kidney within 48 hours after withdrawal of the mycotoxin from feed. No residues of OA were found in muscle or fat. AA

170 DEVRIESE (LA). Pathogenic staphylococci in poultry. *World Poult. Sci. J.* 36(4); 1980; 227-36

Discusses: characteristics of pathogenic staphylococci from poultry and other avian species; epidemiology of avian *S. aureus* strains; and public health significance. BSN

171 TODD (ECD). Poultry associated foodborne disease.- its occurrence, cost, sources and prevention. *J. Food Prot.* 43(2); 1980; 129-39

EGG

172 LEWIS (PD) and HARTLAND (JR). The contribution of second quality to egg grading returns. *World. Poult. Sci. J.* 36(4); 1980; 208-18

Discusses: method of obtaining basic data; statistical analysis; and results and discussion. BSN

173 CATTANEO (P), CANTONI (C) and ROZZONI (C). Methods for the routine determination of the activity of α-amylase in liquid whole egg. *Ind. Aliment.* 19(171); 1980; 313-5 (Italian)

The method of Shrimpton et al (1962) has been compared with the "amylochrome test" for the routine determination of α-amylase activity in liquid whole egg. The latter method gave the best results. KMD

174 KARUNAJEEWA (H). The deposition of synthetic oxycarotenoids in egg yolks. *World Poult. Sci. J.* 36(4); 1980; 219-26

SEAFOODS

FISH

175 SEKI (N), TAKAYASU (M) and KOKURYO (H). Preparation of myosin light chains as an index for identification of fish species from raw muscle and cooked products. *Bull. Jap. Soc. Sci. Fish.* 46(8); 1980; 1001-6 (Japanese)

This paper describes a preparative method of myosin light chains from both raw and cooked fish. Myosin light chains were extracted from defatted and dehydrated fish muscle with urea-2-mercaptoethanol solution at pH 8.0 and precipitated at pH 4.5 in 2M urea. The precipitate was dissolved at pH 7.0 and centrifuged. Myosin light chain extract of the supernatant was further purified by the gel filtration on Sephadex G-100. This preparative method could be applied to raw muscle and cooked products such as Kamaboko, fish sausage and canned fish. KAR

176 TOYOMIZU (M) and HANAOKA (K). Lipid oxidation of the minced ordinary muscle of fish during storage at -5 C and susceptibility to lipid oxidation. *Bull. Jap. Soc. Sci. Fish.* 46(8); 1980; 1000-10 (Japanese)

Minced ordinary muscle of fatty and lean fish were stored at -5 C for 4 weeks and the extent of lipid oxidation was evaluated. The results indicated that the lipid oxidation proceeded in pacific mackerel and sardine, fatty fish, whereas hardly so in plaice, carp and lean fish. In various minced tissues of pacific mackerel, lipid oxidation proceeded during the storage in the following order of skin viscera > dark muscle > ordinary muscle. KAR

177 TOYOMIZU (M), HANAOKA (K) and NAKAMURA (T). Lipid oxidation in the skin during storage of fish in the round at -5 C and the susceptibility predictable for lipid oxidation. *Bull. Jap. Soc. Sci. Fish.* 46(8); 1980; 1011-7

An attempt was made to evaluate the development of rancidity in advance of storage at -5 C. It was noted that the preferential lipid oxidation in the skin was attributed to the lipids of skin which are liable to autoxidize. The tendency toward lipid oxidation in both lean and fatty fish could be predicted in advance of the storage by measuring TBA (at 60 C kept for 2 hours) of the fresh skins. KAR

178 SPINELLI (J) and KOURY (BJ). Some new observations on the pathways of formation of dimethylamine in fish muscle and liver. *J. Agric. Food Chem.* 29(2) 1981; 327-31

Dimethylamine (DMA) formed at a more rapid rate in frozen Pacific whiting muscle that had been preheated (40-60 C), than in unheated muscle. DMA formed only during frozen storage and not during the heating cycle, indicating that its formation was not the direct result of enzymic activity on TMAO but rather to the reaction between TMAO and compounds that were formed during the

heating cycle. The catabolites of cysteine and Fe^{2+} catalyze the degradation of TMAO to DMA: cysteinesulfinic acid > hypotaurine > taurine. *In vitro* studies showed that cysteine did not catalyze the degradation of TMAO to DMA, but it accelerated the formation of DMA in fish liver homogenates. EDTA and Fe^{2+} also accelerated the formation of DMA in fish muscle homogenate, and the data suggest that DMA will not form in fish muscle in the absence of Fe^{2+} AA

179 BELLO (RA) and PIGOTT (GM). Dried fish patties: Storage stability and economic considerations. *J. Food Process. Preserv.* 4(4); 1980; 247-60

Dried fish patties were stored with vegetable protein, modified tapioca, starch, sodium chloride, sodium sorbate and antioxidants. Various parameters like moisture, pH, total volatile nitrogen, thiobarbituric acid test, total pour plate counts, and yeast and mold counts were examined during storage for 4 months at 25 C. Nutritonal quality of the product was studied by PER, amino acid profile and proximate analysis. Small variations in TVN values were detected during the storage period. However, the product remained stable during storage. BSN

SHELL FISH

180 LARKIN (EP) and METCALF (TG). Cooperative study of methods for the recovery of enteric viruses from shellfish. *J. Food Prot* 43(2); 1980; 84-6

181 VAUGHN (JM), LANDRY (EF), VICALE (TJ) and DAHL (MC). Isolation of naturally occurring enteroviruses from a variety of shellfish species residing in Long Island and New Jersey marine embayments. *J. Food Prot.* 43(2); 1980; 95-8

182 TIERNEY (JT), FASSOLITS (A), VON DONSEL (D), RAO (VC), SULLIVAN (R) and LARKIN (EP). Glass wool-hydro-extraction method for recovery of human enteroviruses from shellfish. *J. Food Prot.* 43(2); 1980; 102-4

183 PERKINS (FO), HAVEN (DS), MORALES-ALAMO (R) and RHODES (MW). Uptake and elimination of bacteria in shellfish. *J. Food Prot.* 43(2); 1980; 124-6

184 HUNT (DA). Microbiological standards for shellfish growing areas-what do they mean? *J. Food Prot.* 43(2); 1980; 127-8

185 METCALF (TG), ECKERSON (D), MOULTON (E) and LARKIN (EP). Uptake and depletion of particulate-associated polioviruses by the soft shell clam. *J. Food Prot.* 43(2); 1980; 87-8

OYSTER

186 LANDRY (EF), VAUGHN (JM) and VICALE (TJ). Modified procedure for extraction of poliovirus from naturally - infected oysters using cat-floc and beef extract. *J. Food Prot.* 43(2); 1980; 91-4

187 GERBA (CP), GOYAL (SM), CECH (I) and BOGDAN (GF). Bacterial indicators and environmental factors as related to contamination of oysters by enteroviruses. *J. Food Prot.* 43(2); 1980; 99-101

188 ELLENDER (RD), MAPP (JB), MIDDLEBROOKS (BL), COOK (DW) and CAKE (EW). Natural enteroviruses and fecal coliform contamination of gulf coast oysters. *J. Food Prot.* 43(2); 1980; 105-10

189 SOBSEY (MD), HACKNEY (CR), CARRICK (RJ), RAY (B) and SPECK (ML). Occurrence of enteric bacteria and viruses in oysters. *J. Food Prot.* 43(2); 1980; 111-3

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

APPLE JUICE

190 WILLIAMS (AA), LEWIS (MJ) and TUCKNOTT (OG). The neutral volatile components of cider apple juices. *Food Chem.* 6(2); 1980; 139-51

Examination of the volatile compounds from juices of four cultivars of cider apple ('Bramley's Seedling', 'Sweet Coppin', 'Kingston Black' and 'Yarlington Mill') has led to the definite identification of eighteen alcohols, forty-eight esters, five carbonyls, eight acetals, four ethers, one lactone, one hydrocarbon and three halogenated compounds, tentative evidence being presented for a further 51 components. Fifty-five of the reported compounds have not previously been found in whole apples or juices. Of these *cis* and *trans* linalool oxide and the presence of 5-hexen-1-ol, rather than 2-hexen-1-ol, in the juice of the cultivar 'Kingston Black', are of particular interest. Differences between cultivars were largely quantitative and due to variations in the amounts of components with boiling points in excess of that of hexanol. AA

TEA

191 YAMAGUCHI (K) and SHIBAMOTO (T). Volatile constituents of green tea, gyokuro (*Camellia sinensis* L. var Yabukita). *J. Agric. Food Chem.* 29(2); 1981; 366-70

Seventy nine compounds positively identified and ten tentatively identified by GC/MS analysis of volatile constituents of green tea, gyokuro (*Camellia sinensis* L. var Yabukita), included 17 hydrocarbons, 17 alcohols, 16 aldehydes, 13 ketones, 8 esters, 2 ethers, 1 acid and 5 others. 2,6,6-trimethyl-2-hydroxycyclohexanone, linalool, geraniol, *cis* Jasmine, β-ionone, cyclohexanone, 5,6-epoxy-β-ionone, indole and caffeine, were the major constituents of tea oil. BSN

192 WILLS (RBH) and McBRIEN (KJ). Antithiamin activity of tea fractions. *Food Chem.* 6(2); 1980; 111-4

Tea infusion liquor was separated into molecular weight fractions on various grades of Sephadex gels and the antithiamin activity of these fractions was determined. It was found that tea liquor contains three molecular weight fractions that affect thiamin recovery. The fraction containing the very high molecular weight components had a high level of antithiamin activity but three fractions of low to moderate molecular weight components appeared to protect thiamin from inactivation. AA

ALCOHOL

193 STELTENKAMP (RJ), BOOMAN (KA), DORSKY (J), KING (TO), ROTHENSTEIN (AS), SCHWOEPPE (EA), SEDLAK (RI), SMITH (THF) and THOMPSON (GR). Cinnamic alcohol: A survey of consumer patch test sensitization. *Food Cosmet. Toxicol.* 18(4); 1980; 419-24

The potential for cinnamic alcohol, an important fragrance and flavour ingredient, to induce hypersensitivity or elicit reactions in humans was evaluated by analysing patch-test data. Data from a total of 16,530 patch tests were collected from fragrance and formulator companies on various consumer products, fragrance blends containing cinnamic alcohol, and on the material itself. This study indicates that cinnamic alcohol as present in consumer products and fragrance blends has no detectable potential to induce hypersensitivity. However, cinnamic alcohol itself can induce concentration-related hypersensitivity. The lowest cinnamic alcohol concentration which has been tested and reported as inducing hypersensitivity is 4%. Data for levels below 4% available from the present survey ($\leq$ 0.4%) and form a European survey ($\leq$ 3.2%), reveal no induced hypersensitivity. Cinnamic alcohol at the concentrations present in consumer products and in fragrance blends has a very low potential to elicit sensitization as evidenced by only four confirmed reactions elicited by cinnamic alcohol in 16,530 patch tests. The data presented in this Survey contribute valuable information regarding the safety of the use of cinnamic alcohol in consumer products and fragrances. AA

WINE

194 DeHAVEN (RW) and HOTHEM (RL). Estimating bird damage from damage incidence in wine grape vineyards. *Am. J. Enol. Vitic.* 32(1);1981; 1-4

195 ANDRE (P), BENARD (P), BOURZEIX (M) and FLANZY (C). Carbonic maceration wine-making. IX. Elaboration of pink wines. *Ann. Technol. Agric.* 29(3); 1980; 497-508 (French)

Pink, Carignan wines made by the carbonic maceration technique were found to be better tasting than those made by direct pressing of grape, and were nearly equal to wines made by short maceration. A precise control of the temperature and duration of the first period of fermentation is necessary, to obtain a sufficient quantity of aromatic substances, and a small quantity of phenolic substances. KMD

196 VAN DER MERWE (CA) and VAN WYK (CJ). The contribution of some fermentation products to the odour of dry white wines. *Am. J. Enol. Vitic.* 32(1); 1981; 41-6

This study was undertaken in view of the general concept that some fermentation products, particularly fatty acid esters and higher alcohols affect the bouquet and quality of white table wines. Gas chromatographically purified esters and higher alcohols were added in a variety of combinations to a deodorized wine and evaluated for odour intensity and quality. A combination of six fatty acid esters at levels representative of their concentrations in premium quality white table wines improved the odour quality and intensity significantly. A mixture of isoamyl, n-hexyl and 2-phenethyl acetate as well as a mixture of ethyl-n-hexanoate, ethyl-n-octanoate and ethyl-n-decanoate had similar quality enhancing effects, but not as pronounced as the combination of both mixtures. The addition of 100 mg/L ethyl acetate caused a highly significant decrease in odour quality whereas additions of isoamyl alcohol and isobutyl alcohol at levels representative of their concentrations in standard white table wines, had no significant influence on the quality of the odour. AA

197 SILVER (J) and LEIGHTON (T). Control of malolactic fermentation in wine. 2. Isolation and characterization of a new malolactic organism. *Am. J. Enol. Vitic.* 32(1); 1981; 64-72

Several natural isolates of lactic acid bacteria were made from wines which were undergoing spontaneous malolactic fermentation. These organisms were screened for rapid growth; rapid metabolism of malic acid; and optimal growth response to pH, alcohol, SO_2, fumaric acid, and temperature. Of the natural isolates studied, a strain designated B44.40 showed the greatest potential for rapid growth, efficient metabolism of malate, and greatest tolerances to variations of pH and temperature, When B44.40 was compared to ML-34 and PSU-1, it was found to grow more rapidly in synthetic media and to metabolize organic substrates present in wine such as malate and glucose at a more rapid rate than either ML-34 or PSU-1. B44.40, ML-34 and PSU-1 showed similar tolerances to alcohol and fumaric acid, B44.40 showed less tolerance to SO_2 than either ML-34 or PSU-1. AA

198 BARANOWSKI (JD) and NAGEL (CW). Isolation and identification of the hydroxycinnamic acid derivatives in white riesling wine. *Am. J. Enol. Vitic.* 32(1); 1981; 5-13

HPLC analysis of white Riesling wine gave hydrocinnamic acid derivatives, which were later identified and confirmed by UV,MS, gas,paper and HPLC. The hydrocinnamic acid derivatives included cis- and trans-cafeoyltartrate, cis- and trans-p-coumaroyl tartrate and trans-feruoyl tartrate, cis- and trans-p-coumaroyl tartrate and transferumyl tartrate. BSN

199 WATANABE (M) and SHIMAZU (Y). Quality of wine made from cAMP-added botrytized must. *Am. J. Enol. Vitic.* 32(1); 1981; 73-5

200 WATANABE (M), SHIMAZU (Y) and UEHARA (M). Effect of adenosine-3', 5'-cyclic monophosphate on botrytized must making. *Am. J. Enol. Vitic.* 32(1); 1981; 76-9

An investigation was done to determine the effect of adenosine nucleotides on the activity of acid phosphatase of *Botrytis cinerea* cells and the production of glycerol, polysaccharide, and

gluconic acid in artificially botrytized musts with high sugar contents. The activity of acid phosphatase responsible for the production of glycerol was noticeably stimulated, and adenosine-3', 5' cyclic monophosphate (cAMP) was among the adenosine nucleotides examined. A significant increase of glycerol and a significant decrease of polysaccharide were recognized in the cAMP added botrytized must with high sugar content in submerged culture. Although gluconic acid content increased as the temperature rose, glycerol production was slightly depressed. Therefore, adding cAMP to artificially botrytized musts with high sugar contents produced amounts of glycerol and gluconic acid large enough and an amount of polysaccharide small enough to make botrytized must of high quality. AA

OILS AND FATS

201 LAU (J) and NEELSEN (W). Avoidable and unavoidable wastes of the fat industry. *Fette Seifen Anstrichm.* 82(4); 1980; 166-8 (German)

202 AUROUSSEAU (B) and BAUCHART (D). Stepwise purification of fatty acids: Compared fractional crystallization with urea or from acetone solutions of palmitoleic, heptadecenoic, and oleic acids. *J. Am. Oil Chem. Soc.* 57(3); 1980; 125-8

203 ALLMENDINGER (R). Vacuum generation in fatty acid distillation. *Fette Seifen Anstrichm.* 82(4); 1980; 147-52 (German)

Operation costs i.e., energy cost and depreciation, for the various processing alternatives in vacuum generation for fatty acid distillation are explained. Following alternative processes are compared: 1. Vacuum generation using vapour compressors and ejectors with intermediate condensation in direct condensers with out recycling of cooling water; 2. Same as 1 but with recycling of cooling water; 3. Vacuum generation using vapour compressors and ejectors with intermediate condensation in surface condensers without recycling of cooling water; 4. Same as 3, but with recycling of cooling water. The most economical process is discussed, and technical modifications for the solution of ecological problems and energy savings are shown. AA

SPICES AND CONDIMENTS

204 INMAN (RD), KIIGEMAGI (U) and DEINZER (ML). Determination of chlorpyrifos and 3,5,6-trichloro-2-pyridinol residues in peppermint hay and peppermint oil. *J. Agric. Food Chem.* 29(2); 1981; 321-3

Procedures are described for the determination of the insecticide O,O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate (chlorpyrifos) and its metabolite 3,5,6-trichloro-2-pyridinol in mint hay and oil. After extraction, the chlorpyrifos residues are cleaned up on a silica gel column and quantitated by phosphorus-specific gas chromatography. The metabolite is separated from the extraction solvent by liquid-liquid partitioning with aqueous sodium carbonate, followed by chromatography on acid alumina. The column eluate is treated with N,O-bis(trimethylsilyl) acetamide and analyzed by electron capture gas chromatography.

These methods are sensitive to 0.02 ppm in hay and to 0.1 ppm for the parent compound and 0.5 ppm for the metabolite in oil. Recoveries averaged 88%. AA

SENSORY EVALUATION

205 THOMAS (SM), CAPORASO (F), MILLER (GA) and KIRAL (RM). Importance of sensory evaluation in the stability testing of a medical food. *J. Food Sci.* 46(2); 1981; 435-9

206 FINN (JW) and VARRIANO-MARSTON (E). Application of multiple internal reflection spectroscopy to the study of food surfaces. *J. Agric. Food Chem.* 29(2); 1981; 344-8

Multiple internal reflection spectroscopy techniques were used to record the optical spectrum at the surface of some food materials. Relationships between refractive index of the sample, wavelength, and depth of penetration of the electromagnetic field into the surface of the sample were discussed with starch and fat-encapsulated food acids as examples. The type of sample holder was found to affect the intensities of the multiple internal reflection spectra. The stainless steel sample holder provided more intimate contact between the sample and reflection plate than did the teflon holder and, therefore, increased the intensities of the observed reflections. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

207 SHARMA (HC) and AGARWAL (RA). Environmental pollution due to pesticides industry and methods to reduce it in India. II. *Pesticides.* 14(11); 1980; 3-7 and 17

Discusses: air pollution; consequences on environment; water pollution; extent of pollution of the riverine system; effect of water pollution on biota; and measures to curb pollution. BSN

BIOCHEMISTRY AND NUTRITION

208 CREMER (GA) and BOULTON (R). The hydrolysis of gelatin by an immobilized acid protease. I. Immobilization and hydrolysis kinetics. *Am. J. Enol. Vitic.* 32(1); 1981; 14-7

209 CREMER (GA) and BOULTON (R). The hydrolysis of gelatin by an immobilized acid protease. II. Enzyme reactor design. *Am.J.Enol.Vitic.* 32(1); 1981; 18-20

210 CAPER (SG) and BOYER (KW). Multielement analysis of foods stored in their opened cans. *J. Food Safety.* 2(2); 1980; 105-18

A multielement analysis of canned foods was performed on foods stored in their opened containers. Canned fruits and fruit juices were sampled upon initial opening as well as two and five days after opening. After mineralization, the samples were analyzed for 25 elements using an inductively coupled argon plasma. The following elements were quantitated: Al, Ca, Cu, Fe,Mg, Mn, Ni, P, Sn, Ti, and Zn. The concentration of Fe and Sn increased between successive sampling days. These increases did not exceed permissible limits of Sn in canned foods and the Fe concentrations may be of nutritional interest. A decrease in the concentration of P between successive sampling days was associated with insoluble material formation. Scanning electron microscope micrographs coupled with X-ray fluorescence analysis of the can interior surfaces were used to characterize the corrosion of the interior surface of the cans. AA

211 KELSAY (JL). Effect of diet fiber level on bowel function and trace mineral balances of human subjects. *Cereal Chem.* 58(1); 1981; 2-5

Review discusses: bowel function, iron metabolism and zinc and copper metabolism. BSN

212 SPIVEY FOX (MR), JACOBS (RM), JONES (AOL), FRY (BE) Jr., RAKOWSKA (M), HAMILTON (RP), HARLAND (BF), STONE (CL) and TAO (SH). Animal models for assessing bioavailability of essential and toxic elements. *Cereal Chem.* 58(1); 1981; 6-11

Discusses: definitions; indices for assessing bioavailability; design of animal experiments (factors influencing, choice of experimental diets and conditions); extrapolation from animals to humans; and research needs. BSN

213 RITCHEY (SJ). Interrelationships among protein, zinc and copper in human nutrition. *Cereal Chem.* 58(1); 1981; 18-21

Discusses: experimental approaches with humans; protein-zinc interactions; protein-copper interactions; copper-zinc interactions and zinc utilisation; and future work. BSN

214 ERDMAN (JW) Jr. Bioavailability of trace minerals from cereals and legumes. *Cereal Chem.* 58(1); 1981; 21-6

Literature survey has shown that foods of plant origin provide for less mineral availability than those from foods of animal origin. Probably exogenous and endogenous factors implicate reduction of mineral absorption from cereals and legumes, the most important of them being the role of phytic acid and the impact of the various food processing techniques. BSN

215 NAMIKI (M), OSAWA (T), ISHIBASHI (H), NAMIKI (K) and TSUJI (K). Chemical aspects of mutagen formation by sorbic acid-sodium nitrite reaction. *J. Agric. Food Chem.* 29(2); 1981; 407-11

216 DAY (BP), and GREGORY (JF) III. Determination of folacin derivatives in selected foods by high-performance liquid chromatography. *J. Agric. Food Chem.* 29(2); 1981; 374-7

217 PARRISH (DB). Determination of vitamin K in food. A Review. *CRC Crit. Rev. Food Sci. Nutr.* 13(4); 1980; 337-52

Discusses: formulas, chemistry, nomenclature and activities; vitamin K in foods; bioassays for estimation; physiological assays; outlook; and recent development. BSN

218 BERTRAND (D), TOME (D) and DELORT-LAVAL (J). Formaldehyde treatment of dietary proteins for ruminants. II. Effect of formaldehyde level and of other treatments on nitrogen solubility and *in vitro* deamination. *Ann. Technol. Agric.* 29(3); 1980; 447-62 (French)

219 PHILLIPS (RD). Estimates of body nitrogen in growing rats fed varying levels and qualities of protein. *J. Nutr.* 110(7); 1980; 1441-52

Rats were fed diets containing casein, peanut flour or wheat gluten as protein source with 2-31% of each protein. Linear regression equations between total body N and body weight, carcass water and carcass nitrogen and protein closely fit. In each relationship the equations for casein and peanut protein were not significantly different. KAR

220 EGGERS (H) and MOHR (M). Fundamentals for toddlers. *Ernahrungsforschung.* 24(5); 1979; 174-6 (German)

221 TOBIAS (AL) and GORDON (JB). Social consequences of obesity. *J. Am. Diet. Assoc.* 76(4); 1980; 338-42

222 KETZ (H-A). Promotion of healthy nutrition in the IV. National Conference for Health Education. *Ernahungsforschung.* 24(5); 1979; 130-5 (German)

223 ANDERS (M) and HENKE (P). Problems of need (requirements) research for ensuring planned buildup of inventory funds for setting up community feeding. *Ernahrungsforschung.* 24(5); 1979; 144-6 (German)

224 GAURTH HANSEN (R) and WYSE (BW). Expression of nutrient allowances per 1,000 kilocalories. *J. Am. Diet. Assoc.* 76(3); 1980; 223-7

225 BAIRD (PC) and SCHUTZ (HG). Life style correlates of dietary and biochemical measures of nutrition. *J. Am. Diet. Assoc.* 76(3); 1980; 228-35

226 SOUTHGATE (DAT). What is 'dietary fibre'? *Food Technol. NZ.* 15(9); 1980; 7-9

The choice of definition for the term dietary fibre is discussed in relation to the protective effects that have been postulated for diets rich in dietary fibre and the nature of chemistry of the components of dietary fibre are reviewed. KAR

227 BELO (PS) Jr. and De LUMEN (BO). Pectic substance content of detergent-extracted dietary fibers. *J. Agric. Food Chem.* 29(2); 1981; 370-73

228 COLLINGE (SK), GROSH (RS) and MAHONEY (AW). A comparison of the effects of temperature, enzyme source and sequence of digestion on neutral detergent fiber. *J. Food Biochem.* 4(2); 1980; 111-7

A number of methods for determining dietary fiber have been suggested. Thus, ten modifications of the neutral detergent fiber (NDF) procedure were compared using spinach, bread, and parsnips. Use of *Bacillus subtilis* alpha amylase resulted in lower ($p < .01$) NDF values than did porcine pancreatic amylase. Amylase obtained from *B. subtilis* may contain other enzymes such as hemicellulase and cellulase in small amounts. These enzymes would be undesirable since they may remove some of the fiber fraction, hence the reported NDF would be lower. Temperature of incubation, 21 C or 37 C, did not significantly affect fiber values. Samples predigested with amylase had higher ($p < .01$) fiber values in a high starch food than samples in which amylase incubation occurred after detergent digestion. NDF values may have been higher because starch was less available for enzymatic hydrolysis before the detergent digestion. When amylase was added directly to the detergent solution after refluxing, NDF was not significantly different ($p < .05$) from that quantified by the official AACC method or most of the other treatments. Implications of these findings are discussed with respect to their significance in practical applications. AA

TOXICOLOGY AND HYGIENE

229 SCHACHTELE (CF) and JENSEN (ME). Human plaque pH studies: Estimating the acidogenic potential of foods. *Cereal Food World.* 26(1); 1981; 14-8

230 WATABE (T), OZAWA (N), KOBAYASHI (F) and KURATA (H). Reduction of sulphonated, water-soluble, azo dyes by micro-organisms from human faeces. *Food Cosmet. Toxicol.* 18(4); 1980; 349-52

Human faecal flora from 5 male volunteers reduced four dyes-amaranth, sunset yellow, new coccine, and tartrazine - at mean rates of 38.4, 25.1, 18.2 and 6.5 n mol/mg. protein/h respectively. These reductions proceeded at an approximately constant rate, until the colours had faded almost completely. Rat gut flora were able to reduce amaranth and sunset yellow four to five times faster than human faecal flora, but could reduce new coccine and tartrazine only at a rate approximately equal to that achieved by human faecal flora. This finding has a bearing on the applicability of toxicity tests, conducted on rats, to human beings. KMD

231 KRANTZ (C), MONIER (M) and WAHLSTROM (B). Absorption, excretion, metabolism and cardiovascular effects of beetroot extract in rat. *Food Cosmet. Toxicol.* 18(4); 1980; 363-6

Orally-administered betanin is poorly absorbed, and that the majority of it is metabolized in the gut. Betanin injected iv had effects on the cardiovascular system, transiently increasing the blood pressure and heart rate. It also increased the magnitude of the contractions of an isolated portal vein, *in vitro*. Both the *in vivo* and the *in vitro* effects could be partially blocked by specific adrenergic and cholinergic blockers, but the mechanism of the cardiovascular effects of betanin remains to be determined. AA

232 OMAYE (ST), WIRTZ (RA) and FRUIN (JT). Toxicity of selected compounds found in the secretion of tenebrionid flour beetles. *J. Food Safety.* 2(2); 1980; 97-103

The acute oral LD_{50} for a single administration of p-benzoquinone, 2-methyl-1, 4-benzoquinone, or 2-ethyl-1, 4-benzoquinone was: 165, 145, or 205 mg/kg, respectively in the male rat. Analysis of the dose percent lines for p-benzoquinone and substituted p-benzoquinones demonstrated that the curves did not deviate significantly ($P > 0.05$) from parallelism within this study. 2-methyl-1, 4-benzoquinone was 0.4 times more potent than 2-ethyl-1, 4-benzouinone. Subjective evaluation based on animal observations suggest that the quinones exert toxicity by respiratory impairment. The acute oral toxicity of a single dose of 1-pentadecene was estimated to be greater than 10 g/kg. AA

233 CIEGLER (A). "New Mycotoxins" and their potential significance in foods. *J. Food Safety.* 2(2); 1980; 75-85

Review discusses: structure of zearalenol; structure of naturally occurring Trichothecens; structure of ochratoxins A, xanthomegnin and cytochalasine; and recently isolated toxic fungal metabolites. BSN

234 PRIYADARSHINI (E) and TULPULE (PG). Effect of free fatty acids on aflatoxin production in a synthetic medium. *Food Cosmet. Toxicol.* 18(4); 1980; 367-9

Incorporation of mixed fatty acids from groundnut oil into a liquid synthetic medium stimulated aflatoxin B_1 production by *Aspergillus parasiticus*. Three, individual, saturated fatty acids - myristic, palmitic, and stearic - stimulated aflatoxin B_1 synthesis; while two unsaturated fatty acids - oleic and linoleic-tended to inhibit toxin synthesis. Lauric acid greatly inhibited the growth of *A. parasiticus*. The nett amount of aflatoxin production in a foodgrain may, therefore, be expected to depend on the ratio of saturated to unsaturated fatty acids present. KMD

235 BUTTOLPH (ML) and NEWBERNE (PM). Subchronic studies in rats fed octenyl-succinate-modified food starch. *Food Cosmet. Toxicol.* 18(4); 1980; 357-62

Feeding of starch modified by octenyl succinate produced no adverse effects in rats, under the conditions of this study. KMD

236 ANDERSON (RL) and KIRKLAND(JJ). The effect of sodium saccharin in the diet on caecal microflora. *Food Cosmet. Toxicol.* 18(4); 1980; 353-5

Total aerobic and anaerobic microbial populations of the caecum were compared in male rats fed 0 or 7.5% sodium saccharin for 10 days. A high content of saccharin in the caecum (90 mg/ml) resulted in an increase in the number of aerobic microbes, but did not alter the number of anaerobic microbes. However, one specific anaerobic microbe, which was deleted completely was found to be sensitive to saccharin *in vitro*. Saccharin, at a level of > 50 mg/ml of medium, could also reduce the amount of ammonia produced from urea by *Proteus vulgaris* (ATCC 13315). These observations can, perhaps, explain the previously noted changes in the urine of rats ingesting diets that contain saccharin. KMD

237 OKE(OL). Toxicity of cyanogenic glycosides. *Food Chem.* 6(2); 1980; 97-109

This is a review dealing with toxicity of cyanogenic glycosides in the context of their metabolic involvement with goitre and tropical alaxis neuropathy. The significance of toxicity data is logically related to the nutritional adequacy of diet. KAR

238 FRITZ (W) and UHDE (WJ). Significance of N-nitrosocompounds from the standpoint of food toxicology. *Ernahrungsforschung*. 24(5); 1979; 146-8

N-nitroso compounds can be counted among the most potent of known chemical carcinogens. Their presence in food must be regarded as a serious health risk. Their formation, and possibilities of avoiding it, will be reported in another paper. KMD

239 PHILLIPS (BJ), KRANZ (E) and ELIAS (PS). An investigation of the genetic toxicology of irradiated foodstuffs using short-term test system. 1. Digestion *in vitro* and the testing of digests in the *Salmonella typhimurium* reverse mutation test. *Food Cosmet. Toxicol.* 18(4); 1980; 371-5

A new method of sample preparation by enzymatic digestion *in vitro* is described and its use in the testing of three irradiated foodstuffs by the *Salmonella typhimurium* reverse mutation test is reported. The results of the mutation tests provide further evidence of the lack of genetic toxicity of irradiated foods. AA

240 CAMPANINI (M) and CASOLARI (A). Comparison of two culture methods with the fluorescent-antibody technique for the detection of *Salmonallae*. *Ind. Conserv.* 56(1); 1981; 14-7 (Italian)

When samples of a commercial, dehydrated soup were inoculated with 20 different strains of *Salmonellae*, at a level of 10-20 cells/125 g, the microorganisms could be recovered from 90% of the samples enriched in Muller-Kaufmann tetrathionate broth or in Selenite cystine broth, and only from 70% of the samples enriched in Duleitol selenite medium. Two strains of *S. cholerae-suis* were not detected, either by the culture methods, or by the FA technique. No *Salmonellae* were found in the 5 uninoculated samples by the two, culture methods, whereas one false-positive result was obtained by the FA technique. There was complete agreement between the two, culture techniques and the FA procedure, in the recovery of *Salmonellae* from the inoculated samples. KMD

241 HOBERT (I). Practical problems of treatment for coeliac disease. *Ernahrungsforschung*.24(5); 1979;149-51

The author has explained: (i) What is coeliac disease? (ii) How it is diagnosed; (iii) guidelines for therapy; (iv) the particular points to be remembered in a diet for coeliac disease patients; and (v) the need for a wide assortment of special foods for sufferers. KMD

GENERAL

242 AWASTHI (SK). On ameliorating rural poverty. *Khadigramodyog*. 26(10); 1980; 435-40

243 KORNBLUM (M). The justification for a French force for the export of agro-food know-how. *Ind. Aliment. Agric.* 97(4); 1980; 219-21 (French)

France has a good infra-structure for the export of agro-food know-how: viz., training facilities, institutes of tropical research, agricultural and food industries, and technical centres. Among the most homogenneous and effective lines in French industry are sugar factories and distilleries, canning factories, oil extraction plants, starch factories, malting units, and baby food factories. The dairy industry suffers from lack of an internationally important French exporter of dairy equipment; other industries similarly handicapped are those involved in animal slaughter, brewing, and bread-making. Other lines that are still under developed are meat curring and sausage-making, fish processing, and preparation of cooked dishes. They still have to develop from the artisanal stage to that of modern industries. KMD

244 BONNICHON (M). Documentation assistance in the export of French agro-food know-how. *Ind. Aliment. Agric.* 97(4); 1980; 253-6 (French)

The mode of functioning and work of the International Documentation Centre for Industries Utilizing Agricultural Products (CDIUPA) have been described. KMD

245 GARDERE (M). Towards a strengthening of collective promotion of French agro-food know-how on foreign markets. *Ind. Aliment. Agric.* 97(4); 1980; 259-65 (French)

The Committee for French Economic Exhibitions Abroad (CFMEE) and the French Centre for External Commerce (CFCE) are promoting the sale of French food industry machinery in foreign markets by (a) organizing participation of French companies in trade fairs, exhibitions, and technical conferences; (b) inviting buyers or top executives to France; and (c) publishing technical journals abroad. KMD

246 ROSSIN (M) and AYRAL (J). An association at the service of export-ADEPTA. *Ind. Aliment. Agric.* 97(4); 1980; 267-9 (French)

ADEPTA (Association for the Development of Exchanges in Agro-Food Products and Techniques) has been formed with the participation of 85 member companies. It includes equipment manufacturers, and consultancy groups involved in agricultural and food industries. KMD

247 ESPIARD (E). Point of view of engineers in the agro-food industries on the role of French in the export of know-how. *Ind. Aliment. Agric.* 97(4); 1980; 277-80 (French)

After outlining the strong French position with regard to agriculture and food science and technology, the author has analyzed the know-how concept. He has divided the latter into two parts: (i) know-how to adapt, and (ii) know-how to innovate. He has listed France's strong and weak points in these respects, and finally suggested an approach to the problem of organizing an expansion of know-how. KMD

248 HOLMES (ZA), OSTERMAN (D) and McNAUGHTON (R). Computer-simulated laboratory experiments in food science. I. Model. *J. Am. Diet. Assoc.* 76(5); 1980; 471-3

249 HOLMES (ZA), OSTERMAN (D), MARSHALL (M) and BARRETT (J). Computer-simulated laboratory experiments in food science. II. Evaluation of the model in use. *J. Am. Diet. Assoc.* 76(5); 1980; 474-6

250 SUBRAMANIAN (TV). Gobar gas plant : Optimization and economic feasibility. *Khadigramodyog.* 26(10); 1980; 450-58

251 MOON (NJ). Maximizing efficiencies in the food system: A review of alternatives for waste abatement. *J. Food Prot.* 43(3); 1980; 231-8

The biological and technological inefficiences in the total food system are examined. Energy from sunlight is converted into human food with rather poor efficiency, as only a small portion of the energy available is recovered as food. Maximum efficiency in energy flow is obtained if humans consume plants for food rather than feeding animals for production of human food. The waste generated at each stage in food production and processing is examined and waste abatement alternatives are presented. These alternatives include: changing consumer demand to accept food that generates less waste during production, changing production and processing cycles to be more efficient or accommodate waste products in the environment through conversion to useful products or classical treatment as sewage. Recent advances in reducing the environmental impact of food processing wastes using these technological alternatives are examined. Emphasis is placed on alternatives which maximize overall efficiencies in the food system. AA

252 GREETHEAD (GF). The responsibility of the food industry. *Food Nutr. Notes. Rev.* 36(4); 1979; 163-4

253 GRUNDKE (G). The significance of standards for improving food quality. Part 3. *Ernahrungsforschung.* 24(6); 1979; 167-8 (German)

254 CROCCO (S). AMA proposes alternative food safety testing formulas. *Process. Prep. Food.* 149(4); 1980; 17-8

FOOD PROCESSING AND PACKAGING

255 Carbonell (JV), PINAGA (F) and VALLES (S). Technological aspects of collective eating. V. Dehydrated commodities. *Rev. Agroquim Tecnol. Aliment.* 19(1); 1979; 34-44 (Spanish)

The authors have discussed the role of dehydrated foods (mostly soups) in community feeding. They deal with the methods of dehydration, packaging, reconstitution, sensory and nutritional quality and microbiological quality. KMD

FOOD ENGINEERING AND EQUIPMENT

256 GADONNEUIX (M). The French agro-food equipment industry. *Ind. Aliment. Agric.* 97(4); 1980; 223-9 (French)

The French food industry equipment manufacturers are now establishing

themselves firmly in the world food industry. Their principal virtues are originality of know-how, and easy adaptation to the demands placed on them. The most significant results are yet to come, and will surely come because of the considerable R&D effort made over the past few years. KMD

257 GATINEAU (M). ACMATIFEL : A group of machinery manufacturers for export. *Ind. Aliment. Agric.* 97(4); 1980; 273-4 (French)

Fifteen French manufacturers of equipment for the fruit and vegetable processing industries have joined for the following three purposes: (i) general management and rationalization of processes; (ii) research and development; and (iii) promotion of exports. KMD

258 PUYNESGE (Mlle) and CORDIE (M). The world demand and the French response. *Ind. Aliment. Agric.* 97(4); 1980; 231-5 (French)

French manufacturers of machinery for the food industry are generally one-third the size of their German, American, and Italian competitors. Nevertheless, their exports are increasing at the rate of 15% per year, while the world market for such machinery is growing at the rate of only 11%. French manufacturers make particularly food equipment for the brewing, fruit and vegetable canning, and fish processing industries, as well as for the coffee preparation and for baking. KMD

259 MALMSTADT (HV). Analytical instrumentation for the 1980s. *Analyst.* 105 (1256); 1980; 1018-31

FOOD CHEMISTRY AND ANALYSIS

260 MACRAE (R). Recent applications of high pressure liquid chromatography to food analysis. *J. Food Technol.* 16(1); 1981; 1-11

The latest applications of HPLC under several areas with special reference to food analysis are reviewed under the following aspects: carbohydrates; lipids; vitamins; flavour compounds; toxic compounds (mycotoxins, nitrosocompounds, hydrocarbons, pesticides, drugs), colourants and food additives. BSN

261 FERRO FONTAN (C) and CHIRIFOE (J). The evaluation of water activity in aqueous solutions from freezing point depression. *J. Food Technol.* 16(1); 1981; 21-30

From the data obtained from freezing point studies, water activity of several non-electrolytic and electrolyte solutions for a_w inhibition of microorganisms has been calculated and then compared with a_w values measured at 25 C. In the important range of a_w (0.96 - 0.85), error introduced by the assumption that a_w at the freezing point is the same as that at RT, is relatively small. However, in most of the cases, the difference will not exceed 0.01 a_w units. BSN

262 OSBORNE (BG). Principles and practices of near infra-red (NIR) reflectance analysis. *J. Food Technol.* 16(1); 1981; 13-9

Discusses: IR absorption; near infra-red (NIR) spectra; application of NIR to food analysis; theory of diffuse reflectance; and limitations and scope of NIR analysis. BSN

263 VON GINKEL (JH) and SINNAEVE (J). Determination of total nitrogen in plant material with Nessler's reagent by continuous-flow analysis. *Analyst.* 105 (1257); 1980; 1199-1203

264 THOMPSON (M) and HOWARTH (RJ). The frequency distribution of analytical error. *Analyst.* 105(1257); 1980; 1188-95
Discusses: error distribution and geochemical distribution; analytical error, calibration and detection limit; positively skewed distribution wrongly identified as log-normal; and normal and log-normal distribution. BSN

265 BAIULESCU (GE). Moral ageing of analytical methods. *Analyst.* 105(1256); 1980; 1045-59

266 NORHEIM (G) and Mc OKLAND (E). Rapid extraction of some persistent chlorinated hydrocarbons from biological material with low fat content. *Analyst.* 105(1255); 1980; 990-92

267 HUTTON (RC) and PRESTON (B). A simple non-dispersive atomic-fluorescence spectrometer for mercury determination, using cold-vapour generation. *Analyst.* 105(1255); 1980; 981-4

268 SMITH (RM), SHAWKAT (SAK) and HAYES (WP). Pyrolysis - gas chromatography of proline, hydroxyproline and related peptides. *Analyst.* 105(1257); 1980; 1176-81

269 CLIFFORD (MN), TANG (SL) and EYO (AA). Smoking of foods. *Process Biochem.* 15(5); 1980; 8-11,17
Discusses: wood pyrolysis; factors affecting wood smoke composition and adsorption; time of smoking; effect of kiln temperature; effect of smoking on food; texture, colour and flavour of smoked foods; polycyclic aromatic hydrocarbons (PAH); bacteriostatic properties of wood smoke; and anti-oxidative properties of wood smoke. BSN

270 JACOBSON (F). The detection and elimination of foreign materials. *Manuf. Confect.* 61(1); 1981; 41-4

FOOD MICROBIOLOGY

271 TANNY (GB), MIRELMAN (D) and PISTOLE (T). Improved filtration technique for concentrating and harvesting bacteria. *Appl. Environ. Microbiol.* 40(2); 1980; 269-73

272 CANNEL (E) and MOO-YOUNG (M). Solid-state fermentation systems. *Process Biochem.* 15(5); 1980; 2-7

273 HEIJNEN (JJ), VAN'T RIET (K) and WOLTHUIS (AJ). Influence of very small bubbles on the dynamic K_LA measurement in viscous gas-liquid systems. *Biotechnol. Bioeng.* 22(9); 1980; 1945-56

274 ESENER (AA), KOSSEN (NWF) and ROELS (JA). Carbon dioxide hold-up as a source of error in batch-culture calculations. *Biotechnol. Bioeng.* 22(9); 1980; 1979-83

275 KARANTH (NG) and MANCHANDA (AC). Useful sparger arrangement for fermentations involving heavy mycelial suspensions. *Biotechnol. Bioeng.* 22(9); 1980; 1985-6

276 CASTLEDEN (SL), KIRKBRIGHT (GF) and MENON (KR). Determination of moisture in single-cell protein utilising photoacoustic spectroscopy in the near-infrared region. *Analyst.* 105(1256); 1980; 1076-81

The determination of moisture in single cell protein using photoacoustic spectroscopy and measurements at 1.9 and 1.55 μm is described. Some control of the particle size range of samples is found to be necessary and linear calibration graphs are obtained with a relative standard deviation of 0.04 over the moisture range of about 0-12% m/m. The results obtained using photoacoustic spectroscopy are compared with those obtained using a low resolution nuclear magnetic resonance technique. AA

277 SKIPNES (O), EIDE (I) and JENSEN (A). Cage culture turbidostat: A device for rapid determination of algal growth rate. *Appl. Environ. Microbiol.* 40(2); 1980; 318-25

278 TODA (K), YABE (I) and YAMAGATA (T). Kinetics of biphasic growth of yeast in continuous and fed-batch cultures. *Biotechnol. Bioeng.* 22(9); 1980; 1805-27

FOOD ADDITIVES

279 MULLER (H). Application of ethoxyquin for the quality preservation of plant products (feedstuffs). *Fette Seifen Anstrichm.* 82(5); 1980; 200-3 (German)

280 SRIVASTAVA (LP), HAIDER RAZA, KHANNA (SK) and SINGH (GB). Metanil yellow binding with some of the foodstuffs. *J. Food Sci. Technol. (India)* 18(5); 1981; 194-6

Red gram (*Cajanus cajan*), rice (*Oryza sativa*) casein and starch were mixed with aqueous solution of Metanil yellow at 0.02-1.0% concentration, dried and the colour was reextracted with water and 80% ethanol to study their binding behaviour with the food materials. Depending upon the concentration of the dye used, the total recovery of the dye in water and ethanol ranged from 49.4-61.1 and 22.7-38.3% from red gram dhal, 14.6-47.0 and 19.8-85.5% from rice; 30.0-93.3% and 6.6-70.0 from casein and 91.5-96.9 and 3.2-8.5% from starch respectively. Histological sections of the dhal showed the penetration of the dye inside the starch granules. The study also indicated that the binding capacity of Metanil yellow is more with protein than with starch. KAR

CEREALS

281 GOUGH (MC) and KING (PE). Moisture content/relative humidity equilibria of some tropical cereal grains. *Trop. Stored Prod. Inf.* No.39; 1980; 13-7

Relationship between moisture and equilibrium content and equilibrium relative humidity, at specific temperatures in the range of 26-27 C, was determined for three varieties of milled rice and one variety of each of brown rice, triticale, millet, sorghum and maize. The results are presented and discussed with reference to the results of some previous workers and with regard to safe storage moisture content. BSN

282 SCHNEEWEISS (R). Nutrition research in the food industry: Cereals and cereal components in nutrition. *Ernahrungsforschung.* 24(6); 1979; 177-80 (German)

The author has reviewed (i) the importance of cereals in the human diet; (ii) the world production of cereals, and that of the GDR in particular; (iii) the per caput consumption of bread in various countries and of cereal products in the GDR; (iv) average chemical composition of wheat rye, oats, and barley; (v) the caloric value and nutrient content of various breads, rice, and oat flakes; and (vi) some research problems in the field of cereals and cereal products. KMD

PADDY

283 SRINIVAS (T), BHASHYAM (MK), SHANKARA (R), VASUDEVA SINGH and DESIKACHAR (HSR). Drying-cum-curing of freshly harvested high moisture paddy by roasting with hot sand. *J. Food Sci. Technol. (India)* 18(5); 1981; 184-7

Drying of harvested high moisture paddy under monsoon weather is a problem in some parts of India. Attempts were therefore made to dry high moisture (18-22.8%) paddy by roasting with sand for 1 to 1½ minute at 95 to 155 C followed by tempering for 1½ to 2 hours in metallic bins and finally spreading in air for cooling. Roasting with sand reduced the moisture by 5-10% but as the paddy attained 106 C the proportion of cracks in the grain increased which however could be healed by tempering. Optimum results were obtained when the sand is of -25 +44 BSS size and the paddy to sand ratio is 1:25. The rice obtained after milling had characteristics similar to cured or parboiled rice. KAR

284 VASAN (BS), SINGARAVADIVEL (K) and ANTHONI RAJ (S). Control of spoilage of parboiled paddy during yard drying. *J. Food Sci. Technol. (India)* 18(5); 1981; 211-3

To find out the feasibility of keeping parboiled paddy heaped for 6 days acetic acid (AA) at 0.5% level was used, when drying is not possible due to inclement weather. Effect of AA on moisture, heat development, microbial growth, formation of sugars and dry matter loss was also determined. AA prevented fungal growth in general and *A. flavus* in particular. DM loss was 5.4% in control and 1.5% in treated lots, temperature was 27-29 C in control when it was 39-56 C in the treated lots. The treated paddy had 0.01% AA; the free fatty acid content ranged from 2.00 to 28.36% in control bran and it was 2.32% in bran got from treated paddy. Cooking time and gruel loss were also not affected by AA treatment. Commercial application of AA costs only Rs. 3.50 per 100 kg paddy. KAR

RICE

285 BHASHYAM (MK) and SRINIVAS (T). Studies on the association of white core with grain dimension in rice. *J. Food Sci. Technol. (India)* 18(5); 1981; 214-5

An attempt was made to find out whether the white core in rice is related to grain length (L) and breadth (B). Of the 138 varieties with B range of 1.85 to 3.05 mm and L range of 5.15 to 6.10 when tested showed that all grains having B < 2 mm were translucent and those with B > 2.8 mm had white core. The intermediate B grains had both white core and translucency. White core is not related to L/B ratio. KAR

286 BHATTACHARYA (KR). Breakage of rice during milling. A review. *Trop. Sci.* 22(3); 1980; 255-76

The published literature on the various factors responsible for breakage of rice during milling is reviewed. For many factors quantitative data are not available. The contents of immature and cracked grains, which are a function of the harvesting and drying conditions, have been well established as having a strong influence on breakage. High grain moisture at the time of milling reduces whole rice yield. Differences between mill types with regard to their tendency to break rice have been demonstrated. It has also been suggested that grain type (length, shape, hardness and chalkiness), age of the grain, the presence of infestation, and the fertilisers previously applied influence rice breakage. So far these factors have been studied in isolation, and much remains to be learnt about their interaction. AA

287 PUTRANON (R), BOWREY (RG) and FOWLER (RT). Bulk thermal conductivity of two cultivars of paddy rice grown in Australia. *Food Technol. Aust.* 32(10); 1980; 514-8

The bulk conductivity has been measured using the line source transient heat flow method. Data were obtained at moisture contents between 11 and 21% (wet basis) at 25 C and at temperatures between 20 and 35 C at moisture contents of 12.1 and 18.8% for Calrose variety and for Inga variety at 13.5%. KAR

288 ZAKIUDDIN ALI (S) and BHATTACHARYA (KR). Changes in sugars and amino acids during parboiling of rice. *J. Food Biochem.* 4(3); 1980; 169-79

Parboiled brown rice contained considerably more reducing sugars (RS) but less sucrose and free amino acids (FAA) than raw brown rice. On milling, there was considerably loss of sucrose and FAA from raw rice, but very little from parboiled rice; reducing sugars changed little in either. Processing conditions affected the contents of sugars and FAA. Maximum increase in RS and decrease in sucrose content occurred after soaking at 60 C. Controlled incubation of rice flour, intact grain, separated germ and degermed rice in water showed that considerable changes in sugars and FAA occurred in all cases, the magnitude depending on the circumstances, but a greater part of the sugars leached out into the water during soaking. AA

289 GAYDOU (EM), RAONIZAFINIMANANA (R) and BIANCHINI (JP). Quantitative analysis of fatty acids and sterols in Malagasy rice bran oils. *J. Am Oil Chem. Soc.* 57(4); 1980; 141-2

The fatty acid and sterol compositions of six Malagasy rice bran oils were evaluated. GLC investigation using carbowax 20M revealed 10 fatty acids, mainly palmitic (16-20%) oleic (41-44%) and linoleic (31-37%) acids. An OV 17 column was used to separate eight sterols, mainly β-sitosterol (53-59%), campesterol (16-26%) and stigmasterol (10-13%). No significant variation for the fatty acid and sterol contents was observed among the rice varieties studied. AA

290 FAZLUL HUQ (AK). Some estimates of farm-level storage losses of rice in Bangladesh. *Trop. Stored Prod. Inf.* No.39; 1980; 5-12

Average physical loss reported as the best estimate is 2.04% for paddy and parboiled rice stored in different structures in Bangladesh during the year 1978-79. A factor (1.25) has been calculated to convert the physical loss of paddy, so as to obtain an overall estimate average food loss (2.43 percent). BSN

WHEAT

291 FORTES (M), OKOS (MR) and BARRETT (JR) Jr. Heat and mass transfer analysis of intra-kernel wheat drying and rewetting. *J. Agric. Eng. Res.* 26(2); 1981; 109-25

Wheat drying and rewetting are analysed by applying a model based on non-equilibrium thermodynamics. Physical properties needed for the model were obtained either from the literature or from experiments. Liquid and vapour conductivities were determined from the drying data. Validation of the proposed models for both conductivities was made by comparing predicted and experimental data for wheat kernel centre temperatures and rewetting curves. The same liquid and vapour conductivities determined from the drying (desorption) curves accurately predicted the rewetting (adsorption) curves. The proposed model predicted single kernel drying rates and centre temperatures in the dry-bulb range between 26.7 and 87.8 C and moisture contents between 0.1 and 0.35 dry basis. Moisture movement under these drying conditions is shown to occur mainly in the liquid phase for regions inside the kernel and in the vapour phase for drier regions (closer to the evaporation front) and isothermal conditions can be assumed after 2 to 3 minutes of drying. The drying model accurately predicted wheat rewetting. The model does not apply to early harvested wheat due to the fact that wheat is physiologically immature above 0.4 d.b., (28.5% wet basis). AA

292 SINGH (BPN), MAHARAJ NARAIN and HARPAL SINGH. Kinetics of water vapour sorption by wheat flour from saturated atmosphere. *J. Food Sci. Technol. (India)* 18(5); 1981; 201-6

Kinetics of moisture absorption by wheat flour from saturated atmos phere was studied. The absorption process followed first order kinetics in the difference $(m-m_e)$. The process rate constant obeyed Arrhenius law with a discontinuity between 343 and 348 K. The corresponding activation energies had the same order of magnitude as those for adsorption and hydration. Except for the discontinuity between 343 and 348 K, calculated values of equilibrium moisture content were proportional to water vapour pressure raised to a fractional power. The heat of condensation did not vary much with temperature and had about the same value as that for water. AA

293 RANGA RAO (GCP), LEELAVATHI (K) and SHURPALEKAR (SR). Studies on some quality aspects of semolina from different types of wheats. *J. Food Sci. Technol. (India)* 18(5); 1981; 180-4

Wheat semolina having 3 particle size ranges (-20, +28; -28, +36; -36, +46 mesh) obtained from soft aestivum (Pissi local), medium hard aestivum (WG-357) durum (Bijaga yellow) and dicoccum (Jave) types were studied for total ash, protein, cooking time, water uptake and cooking tolerance of raw and roasted semolina. Bulk density of semolina ranged from 0.56 to 0.59. Total ash and protein content in semolina gradually decreased with decrease of particle size in all types of wheats. Semolina from soft aestivum showed low water uptake rate, cooking tolerance (became pasty before cooking) and water uptake capacity and was of inferior cooking quality, compared to semolina from other wheats. Semolina from durum had the best cooking quality followed by dicoccum. Roasting of semolina at 150 C for 8-10 minutes improved the cooking quality of soft and medium hard aestivum and durum wheats but showed slight adverse effect on dicoccum wheat semolina. KAR

294 McGAUGHEY (WH), DICKE (EB), FINNEY (KP), BOLTE (LC), SHOGREN (MD). Spores in dockage and mill fractions of wheat treated with *Bacillus thuringiensis*. *J. Econ. Entomol.* 73(6); 1980; 775-8

Dockage fractions of wheat treated with *Bacillus thuringiensis* Berliner contained more spores than whole wheat, but 75-85% of the spores remained on the wheat after cleaning, Tempering of the wheat prior to milling reduced viable spore counts by half. More spores were present on the outside layers of the wheat kernels than on the flour. Flour contained 1-5% of the initial number of spores, and bread baked from it contained few or no viable spores. The *B. thuringiensis* content of the flour was too low to cause appreciable mortality among 3rd or later instars of the Indianmeal moth, *Plodia interpunctella* (Hubner), or the almond moth, *Ephestia cautella* (Walker), except when flour was produced from unblended treated wheat. Flour absorptions, bake mixing times, mixogram mixing times, other physical properties of the dough, and bread loaf volumes of flour from treated wheat were essentially the same as those for the controls. Thus, the *B. thuringiensis* treatments had no effect on the baking qualities of flour from treated wheat. AA

295 GECAN (JS), THRASHER (JJ), EISENBERG (W) and BRICKEY (PM) Jr. Rodent excreta contamination and insect damage of wheat. *J. Food Prot.* 43(3); 1980; 203-4

296 ABDEL-KADER (MHK), WEBSTER (GRB), LOSCHIAVO (SR) and WATTERS (PL). Low-temperature degradation of malathion in stored wheat. *J. Econ. Entomol.* 73(5); 1980; 654-6

Malathion (EC) was applied as a water-based solution to provide an emulsion of 8 ppm (AI) on wheat. The treated grain was stored at -35, -20, -5, 5, 10, 20 and 27 C in a study to determine the influence of Canadian Prairie temperatures on the rate of malathion degradation. Very little (< 3%) breakdown of the insecticide residue occurred on wheat that had been stored at -35 and -20 C for 72 weeks. As the temperature increased, malathion residues decreased, the rate depending upon the age of deposit. At the end of storage period, 74,59,26,5 and 4% of the initial deposit remained on wheat stored at -5, 5, 10, 20 and 27 C, respectively. AA

297 GROSSMAN (MV), RAO (CS) and DA SILVA (RSF). Extraction of proteins from buckwheat bran: Application of enzymes. *J. Food Biochem.* 4(3); 1980; 181-8

MILLETS

MAIZE

298 MICHEL (CG). Corn production in the commonwealth caribbean: Problems and prospects. *Cajanus.* 13(1); 1980; 42-52

299 ANAZODO (UGN) and NORRIS (ER). Effects of genetic and cultural practices on the mechanical properties of corn cobs. *J. Agric. Eng. Res.* 26(2); 1981; 97-107

Mechanical properties of corn cobs were determined from quasi-static radial compression force-deformation curves. The relative contributions of the macro-structural components of the corn cob to its apparent elastic modulus, crushing strength and modulus of toughness were evaluated. Effects of corn variety, harvesting date, level of fertilizer application and soil type on cob mechanical properties were investigated. AA

300 BROSIO (E), CONTI (F), DI NOLA (A) and SYKORA (S). Correlation between iodine number and proton relaxation times in maize oil *J. Food Technol.* 16(1); 1981; 67-72

A good correlation was observed between the iodine number of maize oil and an empirical parameter-related to the proton T_1 relaxation time determined by means of low resolution pulsed nuclear magnetic resonance spectroscopy. This result opens up a way to fast and reliable determination of the iodine number during oil hydrogenation. BSN

301 McMILLIAN (WW), WIDSTROM (NW), WILSON (DM) and HILL (RA). Transmission by maize weevils of *Aspergillus flavus* and its survival on selected corn hybrids. *J. Econ. Entomol.* 73(6); 1980; 793-4

Ears of corn, *Zea mays* L., hybrids infested with maize weevils, *Sitophilus zeamais* Motschulsky, previously exposed to spores of *Aspergillus flavus* (link) had almost twice as much fungal infection as ears infested with unexposed weevils. Hybrids differed in amount of insect damage and fungal infection. Apparently, the maize weevil can contribute significantly to increased A. *flavus* infection on corn ears by transporting spores and damaging corn kernels. AA

BARLEY

302 SMITH (EA), BAILEY (PH) and INGRAM (GW). Prediction of the field moisture content of mature barley and wheat by commonly used drying equations. *J. Agric. Eng. Res.* 26(2); 1981; 171-8

A method of predicting the moisture content of standing grain using weather records is developed. The calculation of the moisture content during dry weather is based on equations developed from previous thin layer drying experiments and uses values of the parameters calculated directly from these experiments and not, as in previous models, from the best fit of the equations to field results. However, the rewetting of grain by rain is modelled empirically using field results. The moisture contents calculated compare reasonably well with observed values and with values predicted by a previous, reasonably accurate model. AA

PULSES

303 ESCARDINO (A), MONTON (J) and FONT (R). Dehydration of leguminous seeds. II. Kinetic study of pea drying. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 61-74 (Spanish)

Drying with countercurrnt air circulation of previously blanched, frozen and punched pea seeds has been studied. Four series of experiments have been realised, using air at 40,50,60 and 70 C respectively, changing the gas velocity within each series. During each experiment the air temperature, moisture and flow were maintained. The three characteristic stages of the periods of constant drying velocity and of decreasing drying velocity have been observed. Mathematical expressions relating the moisture of the solid with the drying time and the operation conditions for each of the mentioned stages have been obtained. AA

304 NIRANJAN (GS) and KATIYAR (SK). Chemical examination and biological evaluation of proteins isolated from some wild legumes. *J. Indian Chem. Soc.* 58(1); 1981; 70-2

Protein was obtained from the seeds of *Mucuna prurita*, *Mucuna capitata*, *Cassia tora*, and *Cassia occidentalis* by a simple standardized method, and globulins of considerable purity were isolated. They were then supplemented with methionine and typtophane, and fed to animals. No untoward symptoms were noticed, and the diets proved capable of promoting growth. MVG

305 KATIYAR (SK) and NIRANJAN (GS). Studies on carbohydrates and amino acids of some non-cultivated leguminous seeds. *J. Indian Chem. Soc.* 58(1); 1981; 98-100

The seeds of nine plants - *Cassia fistula*, *Cassia Occidentalis*, *Cassia tora*, *Indigofera glandulosa*, *Indigofera hirsuta*, *Indigofera trifoliata*, *Mucuna capitata*, *M. prurita*, and *Trigonella occulta* - were analysed for their proximate composition. All the seeds may be considered as efficient sources of carbohydrates; the total number of amino acids varied from 9-13 and the content of free amino acids is 0.21-50 g (in terms of glycine) per 100 g dry seed. KMD

BROAD BEAN

306 DAVID (IM) and JITENDRA VERMA. Modification of tempeh with the addition of bakla (*Vicia faba*). *J. Food Technol.* 16(1); 1981; 39-50

Bakla (*Vicia faba* Linn), an indigenous pulse, was subjected to fermentation by the strains of *Rhizopus oligosporus* either alone or blended with soyabean (*Glycine max*). Mycelial growth as viewed on the surface of the fermented mass was best obtained when strain NRRL 3271 was used. Increase in moisture content and pH during fermentation was highest in the case of strain NRRL 2710 irrespective of composition of bakla-soyabean mixture. The tempeh, the fermented product, in each case had a mushroom-like odour, which was independent of the strain used. Bakla and bakla-soyabean (upto 1:1 ratio) tempeh was free of beany flavour but this flavour increased as the soyabean content of the blend was further raised and was perceptibly high when soyabean content reached 75%. Bakla tempeh was more crisp than soyabean tempeh The crispness decreased with increasing soyabean content. AA

BLACK GRAM

307 KAMAT (AD) and KULKARNI (PR). Dietary effect of non starch polysaccharides of black gram (*Phaseolus mungo*). *J. Food Sci. Technol. [India]* 18(5); 1981; 216-7

Rats when fed with 20% non-starch polysaccharides (PS) and 4% hemicellulose B (HB) for 28 days showed reduction in weight HB alone at 4% retarded growth, but along with 10% PS showed beneficial effect, but not at 20% of PS. PS at 10 to 20% increased the length of small intestine and HB at 2 to 4% level increased the weight of stomach and length and weight of both the intestines. KAR

OILSEEDS AND NUTS

308 CHHATTRAPATI (AC). Trends in oilseed production. *Econ. Pol. Wkly.* 15(37); 1980; 1557-61

309 LAKSHMINARAYANA (G). Symposium on processing of oilseeds, oils, by-products and derived products: Techno-economic aspects. *J. Sci. Ind. Res.* 40(7); 1981; 419-22

Presents a resume of the proceedings of the symposium held on the occasion of 36th Annual Convention of the Oil Technologists' Association of India (OTAI) on 14-15 February 1981 at Regional Research Laboratory, Hyderabad, India. MVG

SOYABEAN

310 BLACK (LT) and GLOVER (JD). A simple and rapid HPLC analysis of sugars in soyabeans and factors affecting their standardization. *J. Am. Oil Chem. Soc.* 57(4); 1980; 143-4

311 CARMAN (MG) and DOUGHERTY (M). Kinetic properties of phosphatidylinositol synthase from germinating soyabeans. *J. Food Biochem.* 4(3); 1980; 147-52

CDP-1, 2-diacyl-sn-glycerol (CDP-diacylglycerol): myo-inositol phosphatidyltransferase (EC.2.7.8.11) catalyzes the final step in the *de novo* synthesis of phosphatidylinositol in the microsome fraction of germinating soyabeans. The Michaelis constants for CDP-diacylglycerol and *myo*-inositol were determined for the reaction using a Triton X-100-CDP-diacylglycerol mixed micelle substrate. The K_m values for CDP-diacylglycerol and *myo*-inositol were 30 µM and 0.11 mM, respectively. AA

312 CARMAN (MG) and DOUGHERTY (M). Subcellular localization of phosphatidylinositol synthase from germinating soyabeans. *J. Food Biochem.* 4(3); 1980; 153-8

GROUNDNUT

313 FONG (LYY), TON (CCT), KOONANUWATCHAIDET (P) and HUANG (DP). Mutagenicity of peanut oils and effect of repeated cooking. *Food Cosmet. Toxicol.* 18(5); 1980; 467-70

Peanuts of poor quality, purchased from the Hong Kong market, contained 95-1055 µg aflatoxin B_1/kg. All four samples of peanut oil, purchased from the same market, were mutagenic in the presence of microsomes; but their mutagenicity decreased after repeated cooking. However, when dimethylsulphoxide extracts of the oils were pre-incubated with bacteria and microsomes, the mutagenicity of the cooked oils was greater than that of the uncooked oils; this suggests that the cooked oils may be contaminated with N-nitrosamines. Other brands of uncooked oils were also mutagenic, and contained 98-150 µg aflatoxin B_1/kg. KMD

CASTOR SEED

314 NEISSNER (R). TLC separation of estolides of castor oil fatty acids. *Fette Seifen Anstrichm.* 82(5); 1980; 183-6 (German)

COCONUT

315 JONES (SF). The world market for desiccated coconut. *Trop. Sci.* 22(3); 1980; 277-85

Desiccated coconut is produced in a number of tropical countries but the world market, which comprises a traded quantity of about 125,000 tonnes per annum, is dominated by two producing countries, the Philippines and Sri Lanka. The most important consuming countries are to be found in North America and Western Europe, although trade statistics show that markets for desiccated coconut exist all over the world. The world market in recent years has remained fairly stagnant, showing neither a trend towards growth nor decline. The price of the product is subject to considerable variation but since 1977, has remained at fairly high levels. The CIF price, North Europe, in 1980 rose to over US $1,500 per tonne. A number of potential supplying countries have expressed interest in entering this market and the prospects for new suppliers are examined. AA

316 VISWANATHAN NAIR (PG) and GOPAKUMAR (K). Effect of long-term feeding of a coconut oil-based diet and a combined coconut oil-fish diet on serum cholesterol and fatty acid composition of different organs of albino rats. *J. Food Sci. Technol. (India)* 18(5); 1981; 187-91

Three types of diets all containing cholesterol (1%) besides groundnut oil, coconut oil and sardine oil separately and together were fed to rats for 90 days and the fatty composition in heart, liver, kidney and skeletal muscles and the serum cholesterol level were studied. 12-C and 14-C acids in coconut oil fed, 18-C in groundnut oil fed and 20:5 and 22:6 acids in fish oil fed groups were observed. The level of arachidonic acid in the liver was independent of the dietary supply of this acid, but appeared to be related to the level of linoleic acid in the diet. Dietary sardine oil was found to be very effective in lowering the serum cholesterol level even in the presence of coconut oil which is a cholesterol elevating agent. KAR

PALMYRA

317 GREIG (JB), KAY (SJE) and BENNETTS (RJ). A toxin from the palmyra palm, *Borassus flabellifer*: partial purification and effects in rats. *Food Cosmet. Toxicol.* 18(5); 1980; 483-8

The edible portion of the young shoots of palmyra plants (*Borassus flabellifer*) were found to be neurotoxic, but not hepatotoxic, to rats. The toxic factor was heat-stable, and insoluble in organic solvents. It contains a cationic functional group, and has a molecular weight of C.1400. A 400-fold enrichment of the toxin was achieved, and its effects in the rat have been described and discussed. Brine-shrimp (*Artenia salina*) larvae can be used to assay partially purified preparations of the toxin. KMD

ARECANUT

318 BADAR ALAM IQBAL. Export potential of arecanut. *East. Econ.* 75(15); 1980; 865-7

TUBERS AND VEGETABLES

319 TABEKHIA (MM). Total and free oxalates calcium, magnesium and iron contents of some fresh vegetables. *Dtsch. Lebensmittel-Rundschau.* 76(8); 1980; 280-2 (German)

A survey was conducted on the pH values, ash, total and free oxalates, calcium, magnesium and iron contents of fourteen fresh vegetables. The calcium availability of these vegetables was calculated. The coefficient of correlation found between total oxalate and calcium was r = 0.27; and between free oxalate and calcium, it was r = 0.36. AA

320 NARAIN (NK), LEWIS (CC) and LATHEEF (MA). Gas chromatographic estimation of malathion in seven vegetables. *J. Environ. Sci. Health.* B 16(1); 1981; 75-81

A simple and rapid gas chromatographic method was developed to determine the residue levels in the vegetables. This method proved to be accurate and reliable for total residue estimation, giving recoveries of 90-94% with exception of tomato, from fortified vegetable samples. Residues level on these vegetables sprayed with malathion (2.7 lb ai/acre) were well below the tolerance limit of 8 ppm established by EPA. AA

POTATO

321 SCUDAMORE (KA). Determination of 2-aminobutane in potatoes using high-performance liquid chromatography. *Analyst.* 105(1257); 1980; 1171-5

2-aminobutane is employed to control certain potato tuber diseases. Presence of its residues in potatoes may be determined by distillation of amine, dansylation and by reversed-phase-HPLC with fluorescence detection. Recovery was about 95% from standard solutions, while it was 92% from treated potatoes. The lower limit of detection was below 0.2 $\mu g/kg^{-1}$. BSN

322 McGECHAN (MB). A comparison of some studies of damage susceptibility of different potato varieties. *J. Agric. Eng. Res.* 26(2); 1981; 161-70

Some studies of damage sustained by different potato varieties are reviewed, and their results compared with those from the author's own potato ridge riddling experiments. The use of theoretical models of a potato on a vertically shaken riddle is described. Some similarities were found between the results of riddling and drop height experiments, but an exact comparison based on a theoretical model could not be made because of a lack of knowledge of parameters such as the coefficient of restitution between tubers and metal rods. Limited agreement between the results of riddling and web speed experiments was found. The importance of variety relative to other factors influencing potato damage is discussed with reference to data from the different studies. Statistical techniques applied to the analysis of potato damage data are compared. AA

323 McLAIN (HD) and McKAY (G). The fluidization characteristics of potato chips. *J. Food Technol.* 16(1); 1981; 59-66

Potato chips and potato cuboids showed the same behaviour as plastic cuboids in fluidization characteristic studies. It was found that plastic cuboids and correlations may be used to predict the performance during fluidization of potato chips and cuboids. The minimum transportation velocity of potato chips in vertical lines may be used to perdict some of the fluidization process parameters. BSN

TAPOICA

324 MUTHUSWAMY (P) and RAO (KC). Influence of nitrogen and potash on the quality of tapioca tuber at different months of growth. *Madras Agric. J.* 68(3); 1981; 169-73

Field experiments were carried out over two seasons with varying levels of N and K on tapioca (Variety Burma, H 165 and Coimbatore local). In all varieties, the tuber dry matter increased with the age of the crop but heavy rainfall at the time of harvest caused a reduction. In Burma and H 165 variety , the starch content increased upto ninth month beyond which the increase was insignificant. Crude fiber and HCN significantly increased with N application. K had no effect on fibre content but reduced HCN content. Fibre content was decreased with the maturity of the tuber. Highest HCN content during growth was found in H.165 followed by Coimbatore local and Burma. However, all varieties, registered lowest HCN content at the time of harvest. MVG

CABBAGE

325 SRISANGNAM (C), SALUNKHE (DK), REDDY (NR) and DULL (GG). Quality of cabbage. Part I. Effects of blanching, freezing and freeze-dehydration on the acceptability and nutrient retention of cabbage (*Brassica oleracea* L.). *J. Food Qual.* 3(4); 1980; 217-31

Cabbage was blanched with steam, and chemical solutions. Blanching in solution involved boiling of cabbage with a chemical solution (or water) for 3 minutes at 96 C. In steam blanching, cabbage was vacuum impregnated in a chemical solution for 5 minutes under a 25 in. vacuum and then exposed to steam for 3 minutes. Blanching (without chemical treatment) was achieved within 3 minutes as judged by the inactivation of peroxidase. Among solution- and steam-blanched (without chemical treatment) products, the former had better organoleptic qualities, whereas the latter had higher ascorbic acid retention. Cabbage blanched in the presence of 0.5% malic acid, 0.05% $NaHCO_3$, and 1.2% NaCl was preferred for texture, colour, and overall quality, respectively. The results from chemical (vitamin C and chlorophyll contents), physical (firmness), and sensory evaluations of processed and stored (at -19 C up to 24 months) cabbage indicate blanching in the presence of 1.2% NaCl solution to be the most generally preferred treatment. AA

326 SRISANGNAM (C), SALUNKHE (DK), REDDY (NR) and DULL (GG). Quality of cabbage. Part II. Physical, chemical and biochemical modification in processing treatments to improve flavour of blanched cabbage (*Brassica Oleracea* L.). *J. Food Qual.* 3(4); 1980; 233-50

The cabbage samples (*Brassica oleracea* L.var. Late Glory) were subjected to steam blanching and blanching in solution. The blanching procedures were modified and further evaluated for their potential in offsetting the loss of desirable flavour during processing. The compositions of solutions for blanching were defined in terms of the concentrations of $CaCL_2$, $NaHCO_3$, flavour enhancers (FLVR), and NaCl, FLVR consisted of monosodium glutamate, 5'-inosinate, and 5'-guanylate in the proportions of 95:2.5:2.5. The optimum FLVR concentrations for solution and steam blanching were 0.25 and 0.3%, respectively. Solution- and steam-blanched products lost 2.6 and 19.4% of their ascorbic acid, respectively, when stored at -19 C in a frozen condition for 1 year. The fresh cabbage contained 4.91 and 6.40 mg% of n-butyl and 3-Indolylmethyl derivatives of isothiocyanates, respectively. Blanching (solution and steam) of cabbage resulted in a reduction of n-butyl and 3-Indolylmethyl derivatives of isothiocyanate content. This decrease may explain the parallel decrease in "cabbage flavour intensity" in the processed cabbage samples. Although the addition of myrosinase (from fresh cabbage) to freeze-dehydrated cabbage flavour intensity", acceptability of the product remained lower than for the fresh vegetable. AA

CUCURBIT

327 BHATNAGAR (R), CHOWDHARY (MR), GARG (SP) and KAPOOR (RC). Protein and amino acid composition of certain plants of cucurbitaceae. *J. Indian Chem. Soc.* 58(9); 1981; 932

Seeds of the four plants : viz. *Citrullus vulgaris*, *Cucumis melo*, *Cucumis melo utilissimus*, and *Lagenaria vulgaris* - were examined and found to contain 40.57, 49.95, 57.87, and 44.68% protein respectively. The proteins are, however, lacking in tryptophane. KMD

CUCUMBER

328 COSTILOW (RN), GATES (K) and LACY (ML). Molds in brined cucumbers: Cause of softening during air-purging of fermentations. *Appl. Environ. Microbiol.* 40(2); 1980; 417-22

FRUITS

329 TOPPING (AJ). A recording laboratory penetrometer for fruit. *J. Agric. Eng. Res.* 26(2); 1981; 179-83

A semi-automatic apparatus is described for testing the resistance of fruits (including soft fruit) and other produce to penetration with a Magness-Taylor probe, and having the advantage of needing no adjustment for fruit size and weight. The instrument is easily constructed by any workshop and requires no special skills to use. The output is electrical and can be recorded or stored in any conventional manner. AA

MANGO

330 USHA (K) and ANAND (JC). Quality aspects of commercial raw mango powder (amchur). *J. Food Sci. Technol. [India]* 18(5); 1981; 208-10

Market samples (6) of raw mango powder (amchur) were analysed for chemical composition, insect and mould content. None of the samples contained NaCl, ascorbic acid and SO_2, moisture content was 5.1 to 8.5% and acidity (as anhydrous citric acid, w/w) ranged from 14.4 to 17.8%. Wide variations were noted in tannin content (3.1 to 4.5% as tannic acid) and non-enzymatic browning (12.1 to 16.3 (OD_{420} multiplied by dilution factor). Among insects, fig moth (*Ephestia cautella*) and saw toothed grain beetle (*Oryzaephilus surinamensis* L.) and among moulds, *Aspergillus niger*, *Aspergillus candidus* and *Aspergillus flavus* were observed. KAR

APRICOT

331 COSTELL (E) and DURAN (L). Rheology of apricot puree. Selection of a method of determination of the yield stress value. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 89-101 [Spanish]

The plastic character of the products (i.e. apricot puree's) flow has been confirmed, and a method has been selected for the determination of the yield value. The recommended method is application of the Casson equation, with the modification proposed by the authors. KMD

SUGAR, STARCH AND CONFECTIONERY

332 BEYREISS (K). Fundamentals of the dietetic treatment of disturbances in the resorption or metabolism of carbohydrates. *Ernahrungsforschung*. 24(6); 1979; 169-73 (German)

The author has discussed the biochemistry and pathophysiology of carbohydrate resorption and the individual forms of carbohydrate-induced malabsorption syndromes, as well as their dietetic treatment. Diseases of galactose metabolism, and fructose metabolism, and of genetic disturbances in glucose metabolism have also been dealt with. KMD

333 HSU (TA), LAGISCH (MP) and TSAO (GT). Alcohol from cellulose. *Chemtech*. 10(5); 1980; 315-9

334 WEN-PIN CHEN. Glucose isomerase (A review). *Process Biochem*. 15(5); 1980; 30-5

335 SCHIWECK (H). Problems of definition and demarcation in Food legislation as exemplified by caramel sugar and sugar colouring agents. *Dtsch. Lebensmittel-Rundschau*. 76(8); 1980; 274-80 (German)

336 SINKAR (VP) and LEWIS (NF). Increased glucoamylase production using agricultural by-products. *J. Food Biochem*. 4(3); 1980; 159-68

Media prepared from agricultural by-products including malt, wheat, bran, corn steep liquor and soyabean flour, were found to be an excellent substrate for proliferation of *Aspergillus niger* #57. Glucoamylase yields obtained using various combinations of the above materials were ten to fifteen times higher than those obtained using semi-synthetic media. A medium comprising 11% wheat bran extract and 8% defatted soyabean flour gave the highest enzyme yield of 42 IU/ml as compared with a yield of 2.8 IU/ml obtained using optimal concentrations of glucose and peptone. AA

337 BHATIA (M) and PRABHU (KA). Production of high-fructose syrup by a heat-fixed *Lactobacillus* sp. *Biotechnol. Bioeng*. 22(9); 1980; 1957-77

338 PRUTHI (S) and KUNDRA (R). Gur and khandsari industries: A case study. *Khadigramodyog*. 26(10); 1980; 441-9

339 TYAGI (RD) and GHOSE (TK). Batch and multistage continuous ethanol fermentation of cellulose hydrolysate and optimum design of fermentor by graphical analysis. *Biotechnol. Bioeng*. 22(9); 1980; 1907-28

CONFECTIONERY

340 SCHREIBER (P). Gianduja. *Gordian*. 80(5); 1980; 117 (German)

Gianduja, also known as Milan masses, are fine tasting, delicately melting praline masses with a structure like that of nougat, but they are lighter in colour than nougat. They are made mainly from hazelnuts, with smaller proportions of almonds, sugar, milk constituents, cocoa butter and/or milk or cream chocolate. Specifications and recipes for Gianduja-Praline and Gianduja-Hazelnut-Chocolate masses have been reported. KMD

341 WIGGALL (PH). The acceptability of non-cocoa butter fats in cocoa and chocolate products. *Manuf. Confect.* 61(1); 1981; 21-4

342 JEWELL (GC) and BRADFORD (L). Considerations in chocolate formulations. *Manuf. Confect.* 61(1); 1981; 26-30

BAKERY PRODUCTS

343 SAHAGUN (JF) and HARPER (JM). Effects of screw restrictions on the performance of an autogenous extruder. *J. Food Process. Eng.* 3(4); 1980; 199-216

The brady crop cooker is a low-cost autogenous extruder capable of manufacturing products suitable for human consumption in less developed countries (LDC). Versatility is achieved by the design of the extruder which directly affects its operation. One such design aspect is the inclusion of internal screw channel restrictions. The effects of locations and number of restrictions on operation and product quality were studied. Results indicated that restrictions affected the location of the mechanical energy input and therefore temperature profiles along the screw. Increasing the number of restrictions also promoted cleavage of starch molecules due to the resulting higher shear in the screw channel. AA

BREAD

344 ANON. Example of a bread making firm. Jaws of Stuttgart. *Ind. Aliment.* 19(172); 1980; 394-6 (Italian)

345 ANGERMANN (A). Bread varieties and special breads - Technical possibilities of increasing the demand by diversification. *Gordian.* 80(5); 1980; 104-10 (German)

In the German-speaking nations of Europe, about 20% of the daily calorie requirement of a person is provided by bread at present. The per capita consumption of bread which was 90 kg/year in the 1950s, has fallen to just 70 kg now. There are signs that bread consumption may increase for several reasons. The large number of special breads - multicereal, malt, whole meal, low-calorie, vitaminized, bio-cultivated, and soya breads - could make a positive contribution to increased bread consumption and improved health. KMD

346 MENGER (A). Value determining ingredients in fine baked goods - Remarks on the problem of limiting values. *Gordian.* 80(5); 1980; 97-9 (German)

The legal requirements and specifications that have to be satisfied if a fine, baked product is to have one of the special names (like butter-cream, marzipan, etc.) have been discussed and explained. KMD

347 MORISON (PP), BARTHOLOMEW (JB) and RUSSELL EGGITT (PW). Consistency control for bread doughs. *Ind. Aliment.* 19(172); 1980; 389-93 (Italian)

A quality control system for determining the consistency of bread doughs prepared by the Chorleywood process has been described. It eliminates problems arising out of variable dough consistency and leads to the production of a bread of better quality. It enables one to use locally grown grains (wheats) in the manufacture of bread flour. KMD

348 VIDALI (P) and BRANDOLINI (E). Compressed yeast for bread making: Enzymatic and vitaminic aspects. *Ind. Aliment.* 19(172); 1980; 385-8 (Italian)
A general idea of the enzymic (vitaminic), and metabolic activity that takes place in yeast has been given, on the basis of data from literature The structural formulae of several vitamins have been presented. KMD

BISCUIT

349 ANON. The French biscuit industry. *Gordian.* 80(5); 1980; 120

MILK AND DAIRY PRODUCTS

350 LIBBEY (LM), SCANLAN (RA) and BARBOUR (JF). N-nitrosodimethylamine in dried dairy products. *Food Cosmet. Toxicol.* 18(5); 1980; 459-61
Commercially available non-fat dried milk and dried buttermilk were analysed for volatile nitrosamines using a chemiluminescence detector. N-Nitrosodimethylamine, the only volatile nitrosamine that could be confirmed to be present by mass spectrometry, was detected in eight out of nine samples analysed. The range of levels was 0 to 4.5 ppb (µg/kg) while the mean was 1.9 ppb. The identity of N-nitrosodimethylamine was confirmed by mass spectrometry in five of the samples. AA

351 MARTIN (JH). Heat resistant mesophilic microorganisms. *J. Dairy Sci.* 64(1); 1981; 149-56

352 DONNELLY (LS) and BUSTA (FF). Anaerobic sporeforming microorganisms in dairy products. *J. Dairy Sci.* 64(1); 1981; 161-6

353 WITTER (LD). Thermal injury and recovery of selected microorganisms. *J. Dairy Sci.* 64(1); 1981; 174-7

MILK

354 BHAT (GS), RAMA MURTHY (MK) and BHIMASENA RAO (M). Production of carbonyls during spontaneous oxidation of cow and buffalo milks. *J. Food Sci. Technol. (India)* 18(5); 1981; 210-1
Carbonyl compounds produced during spontaneous oxidation of cow and buffalo milks were estimated. The total carbonyl and monocarbonyl content of milk fat increased during spontaneous oxidation of milk while the ketoglyceride content remained constant. However, the increase in carbonyl content did not correspond with that of TBA values. Though there was a marginal increase in total and monocarbonyl contents, the increase in n-alkanal class was substantial, which may be responsible for the off-flavour in the spontaneously oxidized milk. AA

355 BROUWER (TH). Calculations concerning the determination of the freezing-point depression of milk. *Neth. Milk Dairy. J.* 35(1); 1981; 159-85
Some formulas for the calculation of the freezing-point depression of milk and of standard solutions for calibrating cryoscopes are discussed: osmolality and osmatic pressure of milk; calibration of the apparatus and comparison of the results obtained by different methods for the determination of the freezing-point depressing of milk; interpolation errors of the standards used for calibration; calculation of the true freezing-point depressions of some particular standard solutions described in the literature; derivation of formulas for the calculation of the percentage of water added to

milk, taking into account the alterations of the osmotic coefficient by dilution. The results of these calculations have been checked against the experimental data wherever possible. AA

356 HYSLOP (DB) and FOX (PF). Heat stability of milk: interrelationship between assay temperature, pH and agitation. *J. Dairy Res.* 48(1); 1981; 123-9

As determined by the standard subjective assay procedure, the minimum in the heat stability-pH curve of milk persisted down to at least 116 C. However when samples were not agitated during heating the minimum became progressively less pronounced as the assay temperature was lowered and it disappeared at approximately 116 C. Activation energies (E_a) for unagitated samples were approximately 30 Kcal/mole at pH 6.87 (maximum) and at pH 7.18, throughout the temperature range 116-145 C and for the pH 6.95 (minimum) sample at 116-125 C; however E_a for the pH 6.95 sample increased to approximately 100 Kcal/mole in the range 127-135 C suggesting that some highly temperature-dependent reaction had occurred and caused premature coagulation at certain pH values, i.e. to a heat stability minimum. The stability of concentrated milk (20% total solids) was very low at pH values above 6.9, regardless of whether the samples were agitated or not during heating and the maximum/minimum in the heat stability-pH curve persisted down to at least 90 C in both agitated and quiescent samples. AA

357 MEHTA (RS). Milk processed at ultra-high-temperatures - a review. *J. Food Prot.* 43(3); 1980; 212-25

Ultra-high-temperature (UHT) processing today may describe either a sterilization or a pasteurization process. This review primarily covers the sterilization process which involves heating milk at 130 to 150 C for 1 second or more and then packaging it aseptically. The main topics covered are: history, economics, and theoretical basis of UHT processing, common UHT processes and available aseptic packaging systems; microbial, nutritional, biochemical, and physical aspects of UHT milk; and the flavour of UHT milk. AA

358 SKUDDER (PJ), THOMAS (EL), PAVEY (JA) and PERKIN (AG). Effects of adding potassium iodate to milk before UHT treatment. I. Reduction in the amount of deposit on the heated surfaces. *J. Dairy Res.* 48(1); 1981; 99-113

Additions of potassium iodate to milk at 0.05 and 0.1 mM (10 and 20 ppm) before UHT treatment markedly reduced the rate at which pressure built up during processing. This permitted the use of longer processing times before unacceptable pressures were reached in the heat exchangers. Iodate reduced the amount of protein deposited, particularly in the higher temperature sections of the plant, but had no effect on the deposition of minerals. The more compact nature of the highly mineral deposits offered less resistance to the flow path. Reduction in the amount of protein deposited is likely to be caused by increased denaturation of β-lactoglobulin and oxidation of heat activated sulphydryl groups by the iodate, thus reducing the formation of high molecular weight polymers of sulphur-containing proteins at the heated surfaces. Increasing the level of sulphydryl groups in the milk through the addition of L-cysteine-HCl caused an increase in the amount of deposit formed during UHT treatment. Whilst little detrimental effect on the quality of the milk resulted from additions of iodate at 0.05 mM, milks with 0.1 mM-iodate became bitter during subsequent aseptic storage. Bitterness was a result of iodate-induced proteolysis of casein. AA

359 SKUDDER (PJ). Effects of adding potassium iodate to milk before UHT treatment. II. Iodate-induced proteolysis during subsequent aseptic storage. *J. Dairy Res.* 48(1); 1981; 115-22

The addition of potassium iodate to milk at 0.1 mM before UHT treatment resulted in rapid breakdown of α_s- and β-casein during subsequent aseptic storage. Maximum rates of proteolysis were observed at storage temperatures of 37-45 C, but the reaction was strongly, inhibited by storage at 55 C and by increased holding time at 140 C during the UHT sterilization. Iodate-induced proteolysis of purified α_{s1}- and β-casein was detected only with solutions in the serum phase of raw milk; no proteolysis occurred with solutions in 0.1 M-phosphate buffer (pH 6.7) or in milk ultrafiltrate, irrespective of whether whey proteins and lactose were also added. Thus, it appears that iodate increased the activity of one or more proteolytic components which were present in milk and were unable to pass through an ultrafiltration membrane. However, it is unlikely that iodate acts by increasing the activity of proteinases produced by contaminant bacteria; the presence of iodate did not affect the activity of a proteolytic enzyme isolated from *Pseudomonas fluorescens* PM-1. Furthermore, iodate promoted proteins breakdown during storage of milk drawn aseptically from the cow and subsequently UHT processed. It is suggested that iodate increased the activity of native milk proteinases, other than plasmin which was inactivated by UHT treatment, possibly by preventing thiol-disulphide exchange reactions during the heating process. AA

360 HANKIN (L), STEPHENS (GR) and DILLMAN (WF). Comparison of code date reliability for freshly bottled whole, low fat and non-fat fluid milk. *J. Food Prot.* 43(3); 1980; 175-7,189,230

361 KARAPETIAN (JV) and BADALIANS (SA). Spectrophotometric determination of copper in milk. *J. Dairy Sci.* 64(1); 1981; 130-1

Copper content in samples of milk after dry ashing was determined spectrophotometrically with 6-phenyl 2,3-dihydro-as-trazine-3-thione. No interference from trace elements commonly found was observed during this determination. Percentage of added copper recovery was 99.82% with a standard deviation of 1.16%. BSN

362 WALKER (B) Jr. Lead content of milk and infant formula. *J. Food Prot.* 43(3); 1980; 178-9

A survey to determine the lead content of early-infant food sources was conducted in the District of Columbia. Data indicate that the concentration of lead in infant formula, evaporated milk, and nonfat dry milk exceeds that of fresh cow's milk and human milk. VR

363 JUAREZ (M) and MARTINEX CASTRO (L). Spectrophotometric determination of sodium, potassium, calcium, magnesium, iron, copper, zinc and manganese in market samples of milk. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 45-54

The mean values and standard deviations for Na, K, Ca, and Mg in dry and sterilized milks, as determined by atomic absorption spectrophotometry have been reported. Similarly, the Cu, Fe, Zn and Mn levels in commercial fluid, dry, concentrated and evaporated milks have also been reported. The average contents of these elements did not show any significant differences between liquid and reconstituted dry milk. KMD

364 FAULKNER (A), CHAIYABUTR (N), PEAKER (M), CARRICK (DT) and KUHN (NJ). Metabolic significance of milk glucose. *J. Dairy Res.* 48(1); 1981; 51-6

365 KITCHEN (BJ). Review of the progress of dairy science: Bovine mastitis: milk compositional changes and related diagnostic tests. *J. Dairy Res.* 48(1); 1981; 167-88

Review discusses: changes in milk composition (somatic cells and their estimation techniques); major milk components (lipids, proteins, lactose, anions and cations); enzymic changes (catalases, oxidases and reductases, lactate dehydrogenase, transaminase, lipases and esterases, phophatases, glycosidases); and effects on quality of milk and dairy products. BSN

366 PARODI (PW). Relationship between triglyceride structure and softening point of milk fat. *J. Dairy Res.* 48(1); 1981; 131-8

Eight samples of milk fat were selected for softening point (SP) range. They were separated into high, medium and low molecular weight triglyceride fractions by silicic acid-column chromatography to enable further separation into triglyceride classes by silver ion adsorption thin-layer chromatography. Correlation between triglyceride class content and SP was low. The molecular species composition of the triglyceride classes was determined and correlated with SP. The best correlations were between SP and some low and some high molecular weight triglycerides of the total fat and the trisaturated (SSS) triglyceride class. Correlation coefficients were determined between SP and mole percentage of individual fatty acids and groups of acids. The highest correlations were between SP and individual short chain-length fatty acids (C_4-C_{10}) and groupings of short chain-length acids (C_4-C_{10}) and groupings of long chain-length acids (C_{16}-C_{20}). The triglyceride class composition of a sample of milk fat was determined before and after interesterification. Interesterification increased the SP from 31.6 to 36.3 C and produced increased amounts of both low and high and decreased amounts of medium molecular weight triglyceride molecular species in all triglyceride classes. The increases in the amounts of high molecular weight triglycerides were several times greater than the increase in the amounts of low molecular weight triglycerides. AA

367 VISSER (S). Proteolytic enzymes and their action on milk proteins. A review. *Neth. Milk Dairy J.* 35(1); 1981; 65-88

A selective review is given of the specificity of various proteolytic enzymes known to act in milk protein systems either as indigenous or as added components. Attention is paid to the effects of native and bacterial proteinase on milk and isolated caseins. The proteolysis involved in the processes of milk clotting and cheese ripening is discussed making further reference to the influence of rennet, starter bacteria and milk proteinase on the proteolytic breakdown in cheese. Further, some aspects of the occurrence of bitter flavour in ripening cheese are reviewed. First, a general introduction is given to the classification of proteolytic enzymes and the relationship between their specificity and chemical structure. AA

368 NOBLE (RC), SHAND (JH) and WEST (IG). Novel determination of protein, fat and lactose of milk by liquid scintillation counter. *J. Dairy Sci.* 64(1); 1981; 14-8

The accurate method reported is based on the ability of the scintillation counter to measure colouration or opalescence through attenuation of photons emitted from sealed miniature carbon-14 and hydrogen-3 radioactive standards. The data obtained are in close proximity with those obtained from Kjeldahl, Gerber and colorimetric techniques for protein, fat and lactose, respectively of milk. BSN

369 HOOD (RL). Distribution of milk fat globules in cow's milk high in linoleic acid. *J. Dairy Sci.* 64(1); 1981; 19-24

370 PEARSON (RE), MILLER (RH), SMITH (JW), FULTON (LA), ROTHSCHILD (MF), BALAINE (DS) and COFFEY (EM). Single and multiple trait sire selection. First lactation milk yield and composition, conformation, feed intake, efficiency and net income. *J. Dairy Sci.* 64(1); 1981; 77-86

371 WESTHOFF (DC). Microbiology of ultra high temperature milk. *J. Dairy Sci.* 64(1); 1981; 167-73

372 GEBRE-EGZIABHER (A), HUMBERT (ES) and BLANKENAGEL (G). Heat-stable proteases from psychrotrophs in milk. *J. Food Prot.* 43(3); 1980; 197-200

373 GREEN (ML) and MORANT (SV). Mechanism of aggregation of casein micelles in rennet-treated milk. *J. Dairy Res.* 48(1); 1981; 57-63

374 WOOD (GB), REID (DS) and ELVIN (R). Calculation by computer of individual concentrations in a simulated milk salt solution. I. *J. Dairy Res.* 48(1); 1981; 77-83

375 LYSTER (RL). Calculation by computer of individual concentrations in a simulated milk salt solution. II. An extension to the previous model. *J. Dairy Res.* 48(1); 1981; 85-9

376 COUSINS (CM), RODRIGUES (UM) and FULFORD (RJ). The pyruvate test for monitoring the bacteriological quality of raw silo tank milk. *J. Dairy Res.* 48 (1); 1981; 45-50

Samples of milk from silo tanks were stored at refrigeration temperatures and examined at intervals for pyruvate content and total colony count. Significant relationships between pyruvate, μg/ml, and log colony forming units (cfu)/ml were established for samples stored at 2 C for 2,3 and 4 d (3,4 and 5 d of age respectively) but at 5 and 7 C the relationships after 2-d storage (3 d of age) were not significant. From an overall relationship it was predicted that 4 μg pyruvate/ml would correspond to a bacterial content of 3.7×10^6 cfu/ml with 95% confidence limits of 6.6×10^5 cfu/ml to 2.1×10^7 cfu/ml. AA

377 HEMME (DH), SCHMAL (V) and AUCLAIR (JE). Effect of the addition of extracts of thermophilic lactobacilli on acid production by *Streptococcus thermophilus* in milk. *J. Dairy Res.* 48(1); 1981; 139-48

378 SWEETSUR (AWM) and MUIR (DD). Role on cyanate ions in the urea-induced stabilization of the caseinate complex in skim-milk. *J. Dairy Res.* 48(1); 1981; 163-6

379 BRULE (G) and FAUQUANT (J). Mineral balance in skim-milk and milk retentate: effect of physicochemical characteristics of the aqueous phase. *J. Dairy Res.* 48(1); 1981; 91-7

The effect of physicochemical characteristics (pH, temperature, composition) of the aqueous phase on the mineral balance in milk and milk retentate has been studied. The ratio of colloidal Ca to total protein decreased with pH, but at any given pH the higher the protein concentration, the higher was the ratio of colloidal Ca to total protein, The solubilization of Ca during cooling and the decrease in soluble Ca during heating were approximately the same in retentates and in milk. Among the components of the aqueous phase, soluble Ca and citrate ions were related to the amount of colloidal Ca. AA

380 SHARMA (HS), OJHA (TP), VARSHNEY (NN) and MAHENDRA SINGH. Microwave technique for detection of milk powder loss through spray dryer exhaust air. *J. Food Sci. Technol. (India)* 18(5); 1981; 196-200

Absorption of microwaves by whole milk and skim milk powders and baby food (milk) powder was studied at temperature ranges of 35- 85 C and particle sizes of 100-205 μ in an experimental set up at x-band of frequencies (8-12.4 GHz). The sketch of the experimental set up is given. Microwave absorption for a given particle size decreased with increase in temperature of air and the increase in operating frequency. For air temperature of 35,45, 55,65,75 and 85 C, the corresponding value for microwave absorption were 0.35, 0.34, 0.33, 0.32, 0.31 and 0.30 dB respectively. For particle sizes of 100, 104, 184 and 205 μ, the microwave absorption by skim milk powder was 0.35, 0.36, 0.37 and 0.38 dB respectively. By calculation, the safe operating frequency was arrived at 0.190 to 0.210 GHz. KAR

381 FINIZI (M). Up-to-date information on milk employed for human nutrition. *Ind. Aliment.* 19(172); 1980; 408-14 (Italian)

The protein, aminoacid, lipid, fatty acid, vitamin, mineral, and proximate compositions of milk have been reported in detail. The nutritive value of milk has been discussed, on the basis of its composition. KMD

382 MEYER (A) and KABUS (M). MICORA - a versatile milk protein concentrate. *Ernahrungsforschung.* 24(6); 1979; 164-6

MICORA is produced by heat precipitation of a combination of skim milk and whey. The precipitated protein is separated on a curd separator and then drum dried. The composition of MICORA and the specifications formulated for it have been reported. The preparation of meat products and baked products containing MICORA, and also the use of powdered MICORA in special diets and in households have been described. KMD

383 DALGLEISH (DG). Effect of milk concentration on the nature of curd formed during renneting. A theoretical discussion. *J. Dairy Res.* 48(1); 1981; 65-9

384 THOMPKINSON (DK) and SUKUMAR DE. Gulabjamun from Khoa powder. *J. Food Sci. Technol. (India)* 18(5); 1981; 192-3

Gulabjamun (a khoa based sweet meat) was prepared from fresh and stored (for 120 days at 16-30 C and 37 ± 1 C) khoa powder prepared from (i) cow and (ii) buffalo milk. Khoa powder from cow had a characteristic khoa-like flavour as against slightly cooked flavour in the buffalo khoa powder. The body and texture of the gulabjamun prepared from (i) were soft and spongy while those from (ii) were hard and compact. (i) stored for 120 days and (ii) stored for 75 days at 16-30 C could be used for preparing acceptable quality of gulabjamun. KAR

385 STADHOUDERS (J), HASSING (F) and GALESLOCT (TE). An electrophoretic method for the identification of antibiotic residues in small volumes of milk. *Neth. Milk Dairy J.* 35(1); 1981; 23-33

A procedure is described for the identification of antibiotic residues in milk. Small volumes of milk are extracted with acetone and dilute HCl. The extracts are submitted to high-voltage agar gel electrophoresis, followed by bio-autography. AA

GHEE

386 BARUAH (AB) and CHAKRAVORTY (KL). Thin-layer chromatography of nickel ion in the detection of vanaspati as an adulterant in ghee. *Analyst.* 105(1256); 1980; 1120-3

The TLC technique for detection of trace amounts of nickel in vanaspati involving colour development is sensitive and does not need any elaborate clean up procedures prior to analysis. BSN

CHEESE

387 KOSARIC (N) and MIYATA (N). Growth of morel mushroom mycelium in cheese whey. *J. Dairy Res.* 48(1); 1981; 149-62

388 De KONING (PJ), De BOER (R), BOTH (P) and NOOY (PFC). Comparison of proteolysis in a low fat semi-hard type of cheese manufactured by standard and by ultrafiltration techniques. *Neth. Milk Dairy J.* 35(1); 1981; 35-46

Semi-hard cheese with a fat content of 20%/TF was manufactured by standard and by ultrafiltration (UF) techniques with normal (n) and half-normal (½ n) quantities of rennet. The proteolysis of both cheeses (standard and UF cheese) was followed during ripening, particular attention being paid to the fate of the whey proteins. The amount of soluble nitrogen (SN) was determined by extraction in 0.037 M $CaCl_2$ at pH 7.5. The whey protein content in the SN extract was estimated by use of heat coagulation. Further characterization of the nitrogen compounds was carried out by starch and polyacrylamide gel electrophoresis of the extract of the whole cheese and the soluble N fraction, respectively. The results show that in UF cheese the undenatured whey proteins form about 18.5% of the total protein present in this type of cheese. During ripening they are completely resistant to the proteolytic enzymes of rennet and starter. The proteolysis of the α_{s1}- and β-casein developed similarly in both type of cheeses. However, the concentration of the breakdown products in the soluble nitrogen fraction was lower in the case of UF cheese due to the high content of whey proteins. The degradation of the α_{s1}-casein was proportionally retarded if the ½ n rennet concentration was used. The incorporation of undenatured whey proteins in low-fat semi-hard cheese is discussed in relation to flavour development, consistency and yield. AA

WHEY

389 De WIT (JN). Structure and functional behaviour of whey proteins. *Neth. Milk Dairy J.* 35(1); 1981; 47-64

In particular, the heat sensitivity of the whey proteins appears to be a characteristic property that affects their structure and physico-chemical properties. After a brief analysis of some of the physico-chemical properties of the major whey proteins, attention is paid to their thermal behaviour as observed by differential scanning calorimetry (DSC) in a temperature range up to 150 C. Two distinct heat effects are observed; the first, near 70 C, is denoted as the denaturation heat and the second, near 130 C, is ascribed to unfolding of residual protein structure. Environmental effects such as pH, lactose and calcium salts are discussed in relation to heat denaturation and protein solubilty. It has been shown that heat denaturation of the whey proteins will not necessarily result in an impaired protein solubility when the heating is conducted under the proper conditions. Special

attention is paid to the relation between heat stability in milk and the thermal behaviour of β-lactoglobulin at different pH values and calcium concentrations. Both the heat stability in milk and the thermal behaviour of β-lactoglobulin change quickly in a very narrow-pH range between pH 6.7 and 7.0. The importance of sulphydryl/disulphide groups has been stressed in this relationship. AA

MEAT AND POULTRY

390 CALIFANO (AN) and CALVELO (A). Weight loss prediction during meat chilling. *Meat Sci.* 5(1); 1980; 5-15

The lumped parameter model proposed for computing weight losses is independent of the shape of piece of meat, but allows for fraction of fat and bone to be included. Effect of different operating variables has been analysed with the help of the model. Data obtained show good agreement with experimental results obtained for chilling of steers, cows and lambs under a wide range of operating conditions. BSN

391 CANTONI (C), BIANCHI (MA) and BERETTA (G). Comparative analysis of polyphosphates used in meat processing. *Ind. Aliment.* 19(172); 1980; 397-400 (Italian)

As the composition of polyphosphates used in meat processing is variable, it is necessary for meat processors to analyze the commercial phosphate compositions they employ. A suitable method of analysis has been described. KMD

392 HAMM (R). Phosphates in processed meat products. *Dtsch. Lebensmittel-Rundschau.* 76(8); 1980; 263-9 (German)

A review on use of condensed phosphates for treatment and processing of meat with special regard to the use of diphosphate (DP) for the production of bruchwurst" (frankfurter and bologna type sausages). Reasons for the effect of condensed phosphates are discussed. DP causes swelling of muscle tissue and partial solubilisation of myofibrillar proteins by dissociation of the actomyosin complex. It could be demonstrated that for the effect of DP in sausage mixtures the swelling of minced muscle tissue is more important than the solubilisation of muscle proteins. Contrary to DP, tripolyphosphate does not increase the water holding capacity of meat; it has an effect only in the same measure as it is enzymatically dephosphorylised to DP in the sausage mixture. The sequestering power of condensed phosphates for heavy metal ions results in an inhibition of lipid oxidation and in an increase of the colour stability of meat. AA

393 EUSTACE (IJ). Some factors affecting oxygen transmission rates of plastic films for vacuum packaging of meat. *J. Food Technol.* 16(1); 1981; 73-80

Of the various transparent films used for vacuum packaging of meat, only polyvinyl alcohol (PVA) or polyvinyl chloride (PVDC) showed oxygen transmission rates (OTR) at 3.5 C of 5-15% as compared to those stored at 25 C. At 3.5 C, OTR of nylon films showed lower humidity increases as compared to those at 25 C. At 25 C, OTR gets reduced (expected 75% rh within 50 hours of a change in rh) from 98 to 75%. PVDC films showed very little or had almost negligible effect of their OTR due to humidity changes. Heat shrinkable films showed reduction in their oxygen transmission rate approximately in proportion to the reduction in surface area. BSN

394 GILL (GO). Effect of electrical stimulation on meat spoilage floras. *J. Food Prot.* 43(3); 1980; 190

395 YOUNG (OA), GRAAFHUIS (AE) and DAVEY (CL). Post-mortem changes in cytoskeletal proteins of muscle. *Meat Sci.* 5(1); 1980; 41-55

396 GARDNER (GA). Identification and ecology of salt-requiring *Vibrio* associated with cured meats. *Meat Sci.* 5(1); 1980; 71-81

Seventeen strains, out of 454 isolates of salt-requiring *vibrio* were identified as *V. casticola* (group 1) and 35 as *V. costicola* sub-sp liquefaciens (group 2). The remaining 402 strains were associated with spoilage of cured meats and were found to be non-motile, unable to grow in the presence of 20% (w/v) NaCl, negative in Mollers arginine test and sensitive to pencillin. Unidentified vibrio was found in low salt (noncuring) environments of the factory, the slaughter as well as in butchery areas (pork, bone dust, blood, and in faeces form the lairage. BSN

397 MERKAL (RS) and WHIPPLE (DL). Inactivation of *Mycobacterium bovis* in meat products. *Appl. Environ. Microbiol.* 40(2); 1980; 282-4

The time-temperature combinations necessary to destroy *Mycobacterium bovis* in meat products were determined. In any given time, *M. bovis* was destroyed at temperatures 6 to 7 C (ca. 12 F) lower than those necessary for destruction of members of the *Mycobacterium avium - Mycobacterium intracellulare* complex. Hence, any processing heat adequate to kill *M. avium-M. intracellulare*-complex organisms will provide a very large safety factor with respect to *M. bovis*. Benzalkonium chloride treatment of wiener specimens for cultural examination effectively destroyed the normal flora of wiener emulsion without reducing the numbers of *M. bovis*. Treatment with a phenolic disinfectant followed by formaldehyde vapour was effective in disinfecting equipment contaminated with meat emulsion containing *M. bovis*. AA

398 DRAGONI (I), MARINO (C) and CANTONI (C). "Bresaole" and raw ham surface moulds. *Ind. Aliment.* 19(172); 1980; 405-7 (Italian)

The common fungi that occur on the surface of two kinds of salted and cured meat products - "bresaole" and raw ham - have been identified. Three strains of *Penicillium commune* are normally found on raw, salted, and cured products. *P. lanoso-griseum* found on "bresaole" is an undesirable species that has been isolated. Two species, that are known to cause mycotoxicoses are *P. lanosum* Westling, and *P. frequentans* Westling were also found. KMD

399 ROBERTS (TA), MACFIE (HJH) and HUDSON (WR). The effect of incubation temperature and site of sampling on assessment of the numbers of bacteria on red meat carcasses at commercial abattoirs. *J. Hyg.* 85(3); 1980; 371-80

Several sites on commercial beef, pork and lamb carcasses were sampled at the end of the slaughterline. Total viable counts (TVC) of bacteria were assessed by incubation at 37,20 and 1 C in addition to presumptive coliforms (PC), Enterobacteriaceae (ENT) and faecal streptococci (FS). Statistical analyses showed consistently dirty sites within an abattoir but these sites varied from one abattoir to another. Inter-site differences were unaffected by the incubation temperature of the TVC. Numbers of PC, ENT and FS did not mimic TVC. Empirical sampling plans are proposed to detect the highest count on a carcass by bulking samples from known dirty sites. At the end of the slaughterline TVC 37 C is the most useful bacteriological index. AA

BEEF

400 THOMPSON (JM), BARLOW (R), JOHNSTON (B) and NICHOLLS (PJ). Growth and carcass characteristics of crossbred and straightbred Hereford steers. I. Post-weaning growth. *Austr. J. Agric. Res.* 32(1); 1981; 161-70

401 THOMPSON (JM) and BARLOW (R). Growth and carcass characteristics of crossbred and straightbred Hereford steers. II. Carcass measurements and composition. *Austr. J. Agric. Res.* 32(1); 1981; 171-81

402 SHAW (FD) and BOUTON (PE). The use of electrical stimulation in conjuction with hot boning of beef. *Food Technol. Aust.* 32(10); 1980; 530-2

Muscles were removed from electrically stimulated (1100 V) and non-stimulated (control) beef sides at 1,2 and 4 hours post slaughter and placed in a chiller (1 C) or a freezer (-20 C). Hot boned muscles from stimulated, but not from control, sides were equivalent in tenderness to muscles removed at 24 hour post slaughter (conventional chilling). Electrical stimulation is essential to get a good quality product. KAR

403 O'KEEFFE (M) and HOOD (DE). Anoxic storage of fresh beef. 1. Nitrogen and carbon dioxide storage atmospheres. *Meat Sci.* 5(1); 1980; 27-39

Retail cuts of fresh beef subjected to anoxic gas packaging using a catalytic oxygen scavenging system did not show discolouration under storage at 0 C for 3 weeks. BSN

404 ROBERTS (TA), BRITTON (CR) and HUDSON (WR). The bacteriological quality of minced beef in the U.K. *J. Hyg.* 85(2); 1980; 211-7

405 STILES (ME) and NG (L-K). Estimation of *Escherichia coli* in raw ground beef. *Appl. Environ. Microbiol.* 40(2); 1980; 346-51

A Violet-Red bile (VRBA) incubation technique at elevated temperatures has been proposed at elevated temperature as a quality assurance screening test for presence of presumptive *E. coli* in ground meat. BSN

406 MARRIOTT (NG), GARCIA (RA), KURLAND (ME) and LEE (DR). Appearance and microbial quality of thawed retail cuts of beef, pork and lamb. *J. Food Prot.* 43(3); 1980; 185-9

The data presented suggest that retail cuts of meat should be thawed at refrigerated temperature, especially if thaw time exceeds 8 hours. Elevated thaw temperature (25 C) and increased thaw time were related to colour degradation and reduced overall appearance of frozen steaks and chops. Frozen retail cuts of meat should be thawed at refrigerated temperature (4 C) for less than 24 hours to maintain optimal appearance and minimal microbial contamination. VR

407 MARRIOTT (NG), GARCIA (RA), PULLEN (JF) and LEE (DR). Effect of thaw conditions on ground beef. *J. Food Prot.* 43(3); 1980; 180-4

Appearance traits, taste and microbial load were affected ($P < .05$) by thaw time and temperature. Increased coliform growth at 25 C especially after 8 hours, suggests a need to thaw ground beef at refrigerated temperature to reduce public health concern. Results suggest that a proper thaw time and temperature to maintain acceptable appearance and taste of ground beef would be 24 hours or less at refrigerated temperature. VR

408 QUARTEY-PAPAFIO (EA), MARSHALL (RT) and ANDERSON (ME). Short-chain fatty acids as sanitizers for beef. *J. Food Prot.* 43(3); 1980; 168-71

The bactericidal efficacies of selected short chain fatty acids against microorganisms isolated from beef were determined. Eleven cultures were exposed to individual sanitizers and mixtures. 2% formic acid and 1% formic plus 1% acetic acid were most effective in destroying 84 and 73% of the test cultures respectively. Addition of ascorbic acid to the sanitizer to reduce oxidation of the meat, pigments resulted in lowered microbial counts, with a addition 5% ascorbic acid, discolouration was noticeable but not extensive. VR

409 NORMAN (GA) and CIA (G). The influence of carcass position during rigor on the tenderness of bovine muscles from mature zebu animals. *Trop. Sci.* 22(3); 1980; 287-96

The suspension of beef carcass by a hook through the Obdurator foramen results in substantial improvements in tenderness in almost all muscles of the beef hindquarter, the notable exception being the Psoas major which accounts for only 2 per cent of the saleable meat in a beef side. An increase in the sarcomere length of all hindquarter muscles with the exception of the Pscas major was also noticed. VR

PORK

410 HOUBEN (JH) and KROL (B). Acceptability and storage stability of pork products with increased levels of polyunsaturated fatty acids. *Meat Sci.* 5(1); 1980; 57-70

RABBIT

411 SEPERICH (GJ) and PRICE (JF). The similarities between the activities of the calcium activated sarcoplasmic factor and the kinase activating factor from rabbit skeletal muscle. *Meat Sci.* 5(1); 1980; 17-26

CHICKEN

412 LILLARD (HS). Effect on broiler carcasses and water of treating chiller water with chlorine or chlorine dioxide. *Poult. Sci.* 59(8); 1980; 1761-6

Chiller water in a commercial broiler processing plant was treated with 20 ppm chlorine (Cl_2), 34 ppm Cl_2, 5 ppm chlorine dioxide (ClO_2), or 3 ppm ClO_2. Microbiologically, water samples were significantly better when 34 ppm Cl_2 or 5 ppm ClO_2 rather than 20 ppm Cl_2 or 3 ppm ClO_2 was used. Despite differences in chill-water quality, all treatments significantly reduced bacterial counts of carcasses over those chilled in untreated water, although there was no significant difference in carcass counts among different treatment groups. AA

TURKEY

413 JANTAWAT (P) and DAWSON (LE). Effects of air at various tension levels on stroage stability of mechanically deboned poultry meat. *Poult. Sci.* 59(8); 1980; 1788-94

Air pressures equivalent to 0,126,380 and 760 mm Hg were assigned to packages of mechanically deboned chicken meat (MDCM), mechanically deboned turkey meat (MDTM) and their lipid extracts. All treated samples were stored at -18 C up to 3 months. Changes in phospholipid polyunsaturated fatty acids (expressed as unsaturation ratio, $C_{1.8:3-2.2:6}/C_{16:0}$) and 2-thiobarbituric acid (TBA) absorption values were used to follow lipid oxidation reactions. Samples packaged under 0 mm Hg and samples packaged at 126 mm showed similar losses of polyunsaturated fatty acids and comparable development of TBA reactive substances. After 1 month storage, TBA absorption values of MDTM samples packaged under vacuum were significantly lower than those packaged at 126,380 and 760 mm of Hg. Significant differences in mean unsaturation ratios were observed between the lipid extracts from MDCM and the meat itself, but not between those from the lipid extract from MDTM and turkey meat. Significant differences in TBA reactive substances were found between turkey and chicken lipids. AA

EGG

414 SATO (Y) and KATO (T). Chemical composition of the chalazae and their deterioration during storage of eggs. *Poult. Sci.* 59(7); 1980; 1416-22

The chalazae of hens eggs were solubilized by reduction or sonication and fractionated by density gradient electrophoresis or DEAE-cellulose chromatography. The chalazae have a carbohydrate poor component and a carbohydrate-rich component. As a result of chemical analysis, the carbohydrate-poor component was the same as that of insoluble ovomucin. The carbohydrate-rich component was slightly different from that of the insoluble ovomucin, especially in its amino acid composition and cellulose acetate electrophoretic behaviour. The decreased percentage of carbohydrate in the chalazae during storage of egg was markedly less than that in insoluble ovomucin. The part solubilized from the chalazae sample, when incubated in buffer of pH 9.5 and an ionic strength of 10^{-3} for 21 days at 30 C, was only 2% in weight, although its amino acid composition was similar to that of the carbohydrate rich component released from insoluble ovomucin. These findings suggested that the deterioration of the chalazae was not as rapid as the rest of thick white during storage. AA

415 JOHNSON (EA), LEWIS (MJ) and GRAU (CR). Pigmentation of egg yolks with astaxanthin from the yeast *Phaffia rhodozyma*. *Poult. Sci.* 59(8); 1980; 1777-82

The red yeast *Phaffia rhodozyma* was tested as a dietary pigment source for egg yolks of laying hens and Japanese quail. It was found that astaxanthin from broken yeast or prepared yeast oil but not from intact yeast cells was deposited in egg yolks. The efficiency of carotenoid deposition was approximately 4%, and it was only slightly dependent of the astaxanthin concentration in the diet. Astaxanthin was probably deposited without metabolic alteration in egg yolks. When *P. rhodozyma* was fed to laying hens at several concentrations and in combination with marigold flower pigments or yellow corn, a wide range of colours was achieved, depending on the yeast concentration in the feed, the dominant wavelength of chicken egg yolks ranged from 571 nm to 593 nm. AA

SEAFOODS

416 LUPIN (HM), BOERI (RL) and MOSCHIAR (SM). Water activity and salt content relationship in moist salted fish products. *J. Food Technol.* 16(1); 1981; 31-8

A linear relationship between water activity (a_w) in moist salted fish products and NaCl molality was found: $(a_w)_{SF} = 1.002-0.042m$; where m is the NaCl molality considering it to be in true solution in the total water content of the product. The linear approximation was analyzed with reference to the a_w values of pure NaCl solutions and to a thermodynamic approach for a_w prediction; it was found consistent and appropriate for a_w estimation in moist salted fish products, with errors within the accepted range for intermediate moisture foods (IMF). AA

417 KOLI (AK), WHITMORE (R), CONYERS (W) and FELIX (K). Mercury content of the saltwater fish from the Atlantic ocean coast of South Carolina. *J. Indian Chem. Soc.* 58(6); 1981; 558-60

All the fish analyzed contained mercury levels below the currently accepted guideline of 0.5 ppm. Larger fish contained higher concentration of mercury than smaller fish of the same species. KMD

418 YU (SY), MITCHELL (JR) and ABDULLAH (A). Production and acceptability testing of fish crackers ('keropok') prepared by the extrusion method. *J. Food Technol.* 16(1); 1981; 51-8

Keropok - the traditional Malaysian snack food (extruded from a blend of fish and tapioca flour) showed degree of expansion, when fried, as a function of extruder temperature and ratio of fish to tapioca flour. It was observed that expansion decreased with increasing fish content. Extruded products were found acceptable as compared to traditional products when assessed by organoleptic studies. BSN

COD

419 MULLER-MULOT (W), ROHRER (G), SCHWARZBAUER (K), MAURER (R), OESTELHELT (G), SCHMIDT (K) and ALLEMAN (L). Identification of naturally occurring vitamin D_3 esters in cod liver oil. A contribution to vitamin D_3 analysis. *Fette Seifen Anstrichm.* 82(5); 1980; 177-83 (German)

The naturally occurring vitamin D_3 esters from cod liver oil (*Gadus morrhua*). Isolated by freezing, CC, TLC and HPLC were identified by analysis (GC, GC/MS and HR-MS) of fission and derivative products, to be esters of the 5,8,11,14,17 eicosapentaenoic acid and the 4,7,10,13,16,19 decosahexaenoic acid. The two fatty acids were identified by GC in form of their methylesters and by MS when transformed to pyrolidides. Vitamin D_3 was characterized as trimethylsiloylether of the GC pyrolysis products. The HPLC retention time of synthezised docosahexaenoic acid ester of vitamin D_3 was identical with that of the corresponding genuine vitamin D_3 ester. AA

HAKE

420 GIANNINI (DH), DAVIDOVICH (LA) and LUPIN (HM). Adaptation of the usual methods for the determination of total volatile bases in hake (*Merluccius hubbsi*). *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 55-60 (Spanish)

The causes of error in the determination of total volatile bases in hake (*Merluccius hubbsi*) by the antondcopoulos and direct distillation (Nordsee Gmbh) methods were investigated with potentiometric techniques and recovery assays with ammonia. According to the results obtained, the following modification to both methods are proposed: (a) increasing the boric acid amount by using 50 ml of a 2% solution, (b) replacing the established distillation time by the collection of 250 ml in the antondcopoulos method and 180 ml in the direct distillation method, (c) titrating to the end point with mixed indicator. With these modifications, both methods were found to be equivalent, with a dispersion lower than 3%. AA

PERCH

421 LINDSAY (RC). Comparative sensory analysis of aquacultured and wild yellow perch (*Perca flavescens*) fillets. *J. Food Qual.* 3(4); 1980; 283-9

RIBBON FISH

422 PILLAY (KS) and PREMJITH (S). Chemical composition of ribbon fish from a nutritional point of view. *J. Inst. Chem. (India)* 53(1); 1981; 15-6

Ribbon fish (*Lepturacanthus savala*) is a common food fish found near the Indian and Australian coasts. It contains 17.77% protein, 0.068% glycogen, and 5.99% fat (or total ether extractives). The protein is rich in lysine, aspartic acid, leucine, and alanine (9.1,9.1,7.4 & 6.9 g/100 g muscle) and has negligible amounts of cystine, glutamic acid, and tyrosine. The lipid has at 20 C, a density of 0.908; refractive index 1.4862; iodine value 126.91; saponification value 148.08; non-saponifiables 80 mg/g (or 8.0% of fat), consisting mainly of cholesterol 72 mg/g (or 7.2 of fat). The fish may be classified as a medium grade food fish. KMD

PRAWN

423 HEBBAR (KS) and HIREMATH (GG). Effect of freshness on the drip loss and other quality parameters of frozen prawns (*Metapenaeus dobsoni*). *Mysore J. Agric. Sci.* 14(4); 1980; 584-8

Fresh prawns after catch were (i) immediately iced, (ii) iced after 2 hours and (iii) after 4 hours of exposure to atmosphere; packed in tin cans and frozen. They were stored for 5 months at -20 C after putting in polythene pouches and packing in carton boxes. Samples were analysed after freezing and at 1,3 and 5 months after storage for N, moisture, crude fat and crude ash. After 3 months (i) showed very little drip loss or weight loss as compared to (ii) and (iii). But after 5 months drip loss was 12.5% in (i), 14.4 in (ii) and 15.3% in (iii). Delayed icing also decreased water holding capacity and salt soluble N contents of stored frozen prawns, (i) was acceptable in taste and texture even after 5 months, whereas (ii) and (iii) were acceptable upto 3 and 2 months respectively. KAR

CRAB

424 COCKEY (RR). Bacteriological assessment of machine-picked meat of the blue crab. *J. Food Prot.* 43(3); 1980; 172-4

Microbiological analyses were made on samples of meat of the blue crab taken at each step throughout the machine pick operation to determine the effect of operating procedures on the bacterial content of the finished product. The aerosol, caused by vibration of the machine, was the major source of contamination, producing counts well in excess of 100,000/g in the finished product. The bacterial quality of machine-picked crab meat using the dry sanitized machine compared favourably with that of hand-picked meat. VR

PROTEIN FOODS

425 FANTOZZI (P). Non conventional vegetable proteins. III. *Ind. Aliment.* 19 (172); 1980; 415-21 (Italian)

FRUIT JUICES AND BEVERAGES

426 ANON. The world's food and beverage industries. *Flussiges Obst.* 47(1); 1980; 22-4 (German)

427 KUHTREIBER (F). Separation of precipitated hop resins in cylindro-conical tanks. *Brew. Dig.* 55(6); 1980; 30-3

FRUIT JUICES

428 KORTH (A). Repeated modification of the EC regulation on fruit juices. *Flussiges Obst.* 47(2); 1980; 61-4 (German)

429 LAFUENTE FERRIOLS (B). Preparation of fruit juices of high quality. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 1-13 (Spanish)

The author has reviewed the techniques currently employed in the manufacture of fruit juice of high quality, covering: raw materials; extraction; preservation techniques, including pre-conservation en masse; preservation under a low pressure of CO_2, or aseptic storage under N_2, or with the help of chemical preservatives; and storage at low temperatures. KMD

430 ROTHER (H). Necessary analyses of mother juices, concentrates and finished products in the production units. *Flussiges Obst.* 47(2); 1980; 38-43

The importance of various aspects like sensory evaluation, quality control, methods of determination of extract and acid contents in the juices and concentrates have been described. The author has described the methods for determining extract content (relative density or specific gravity) of juices with the help of pyknometer, refractometer. Ochsle balance and determination of acidity by a pH measuring device. VR

LIME JUICE

431 SHAILA BHATAWADEKAR (P). Clarification of lime juice by cellulase of *Penicillium funiculosum*. *J. Food Sci. Technol. (India)* 18(5); 1981; 207-8

Clarification of lime (*Citrus aurantifolia*) juice by cellulase of *Penicillium funiculosum* was studied at pH 2.2 to 5.6 by keeping the enzyme concentration at 0.82-3.2 filter paper units (FPU) in the juice at 30,40 and 50 C for 2 to 32 hours maximum turbidity reduction of 90% was obtained at pH 4.0 to 4.5 and temperature of 30 to 40 C with an incubation period of 18 to 24 hour and addition of 1.64 FPU concentration enzyme. KAR

ORANGE JUICE

432 WALLRAUCH (S). The natural content of amino acid in orange juices and its dependence on the harvest-time of the fruits. *Flussiges Obst.* 47(2); 1980; 47-57 (German)

The natural influence of the harvesting time on the composition of amino acids in 114 samples of orange juice has been examined. The concentration of certain amino acids is influenced by the harvesting time of the fruits (e.g. proline, arginine, r-aminobutyric acid, aspartic acid). Other acids such as serine, glutamic acid, glycine, alanine and threonine remain practically constant throughout the period. Use of amino acid analysis for an evaluation of adulterations are shown with two adulterated commercial products as examples. VR

433 GALENSA (R) and HERRMANN (K). Determination of Hesperidin in orange juices through high pressure liquid chromatography. *Dtsch. Lebensmittel-Rundschau.* 76(8); 1980; 270-3 (German)

Two methods, HPLC and Davis method, were used to determine the content of Hesperidin in orange juices. The exact content could be determined only by HPLC. The hesperidin content determined by Davis method was twice than that found by HPLC.. For the two orange varieties, "Jaffa Shamouti" (HPLC 368 mg/1, Davis 730 mg/1) and "Spanish Navels" (HPLC 583 mg/1, Davis 1180 mg/1) data have been presented and discussed. VR

434 LAFUENTE (B), GASQUE (F), NIETO (P) and IZQUIERDO (L). Storage stability of hot and cold filled orange juice. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 82-8 (Spanish)

Storage stability at 0-2 C of Comuna orange juice as influenced by the following filling methods was studied (1) aseptically cold filled in bottles, (II) hot filled in bottles and (III) canned in lacquered tinplate cans. Shelf life of (I) at different storage temperatures (0-2 C, 8-10 C and 20-22 C) was also studied. Results showed that (I) had a higher level of sensorial acceptance than (II) and (III) juices during the first four weeks of storage at 0-2 C. Thereafter acceptance of both juices tended to be similar. The type of container (glass or lacquered tinplate) seemed to have no influence on acceptance of hot filled juices. Aseptically cold filled orange juice must be stored below 10 C. At room temperature a significant loss of acceptance was detected after four weeks when the juice was prepared from fresh fruits and after two weeks when it was reconstituted from frozen concentrate. AA

APPLE JUICE

435 KOCH (J). The determination of the proportion of apple juice in apple juice concentration. *Flussiges Obst.* 47; 1980 (2) 43-7; (3) 121 (German)

The apple juice concentration can be calculated from the contents of potassium, phosphate and ash in apple juice beverages. In unadulterated products, the juice concentration can be calculated from the reference values for 100% apple juice, K = 1175 mg/l and PO_4 = 200 mg/l. Since the quantity of ash is small it can be neglected. This method is sufficiently, precise to determine the minimum concentration of 30% of apple juice. Higher concentrations are indicated by the potassium and phosphate values. VR

436 GORTGES (S). The influence of the raw material on the clarification and stabilization of apple juice. *Flussiges Obst.* 47(1); 1980; 18-9 (German)

SOFT DRINK

437 WARNE (AD). An investigation into breakage of carbonated soft drink bottles. *Food Technol. Aust.* 32(10); 1980; 536-8

Fracture analysis of bottles over a period of three years indicated that the breakage is caused by consumer mishandling. KAR

COFFEE

438 VOILLEY (A) and SIMATOS (D). Modeling the solubilization process during coffee brewing. *J. Food Process. Eng.* 3(4); 1980; 185-98

Two different processes may be considered in coffee brewing. (1) Solubilization of some compounds from the grind into the water, and (2) filtration of the extract through the grind. These two processes have been dissociated in our experimental studies. The results obtained for the first of them. Solubilization, will be reported here. Variations in soluble content as a function of time, temperature, proportion of coffee to water were interpreted in relation to a model based on the general equation of diffusion and assuming the grind to be spherical particles suspended in a homogenous system. Qualitative variations in the chemical composition of the extract have also been determined by some physico-chemical measurements: Optical density, titratable acidity, viscosity, caffein content. AA

TEA

439 THANARAJ (SNS) and RAMASWAMY (S). Polyphenolic pigments content of clonal and seedling black teas. *J. Inst. Chem. (India)* 53(3); 1981; 89-91

The contents of polyphenolic pigments - theaflavins, thearubigins, and highly polymerized substances - in 22 clonal black teas have been reported. The pigment contents of teas manufactured by the CTC method have been compared with those of teas made by the orthodox method. The CTC teas appear to have higher levels of the three constituents, and also a higher proportion of theaflavins in the total pigments. KMD

COCOA

440 KATTENBERG (HR). The quality of cocoa butter. *Manuf. Confect.* 61(1); 1981; 32-8

The effect of processing of cocoa beans to cocoa butter, keeping in view the natural variations observed in beans due to differences in origin and quality have been studied. Data on the physical, chemical and processing aspects in the factory and the laboratory of the beans and butter have been reported. The results of the factory experiments have shown the need to use right quality beans to avoid deodorization, hydrolysis and possible rearrangement of triglyceride molecules in cocoa butter. BSN

WINE

441 SKIBBE (H). Cider, fruit wines and sparkling fruit wines in 1979. *Flussiges Obst.* 47(1); 1980; 4-5 (German)

442 SPEDDING (DJ) and STEWART (GM). Use of a sulphur dioxide gas sensing membrane probe in wines and juices at their natural pH. *Analyst.* 105(1257); 1980; 1182-7

For determination of 'Free' Sulphur dioxide in aqueous solutions of pH 3-4 in the concentration range 10^{-2} to 10^{-4} mol^{1-1}, a sulphur dioxide gas sensing membrane probe was employed. The accuracy and reproducibility of the method have made it useful for analysis of sulphur dioxide in juices and beverages. BSN

443 COOTES (RL) and JOHNSON (R). A fluorescent staining technique for determination of viable and non-viable yeasts and bacterial in wineries. *Food Technol. Aust.* 32(10); 1980; 522-4

Information about a new centrifugal design which permits polishing of liquids or harvesting of fine particles without the aid of conventional fitting is described. The separator removes particles down to 0.5 μm with an efficiency of 99% or better. Useful in wine and juice making. KAR

444 BLAS (E.de), SOMAVILLA (JF) and ARROYO (V). Fermentation agents of grape musts from the Spanish district of Mentrida. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 75-81 (Spanish)

Continuing their earlier work, the authors have made a taxonomic study of 20 samples of grape must from the Mentride (Toledo) district. *Saccharomyces cerevisiae* played an important part in all the samples examined. The twelve strains collected at the beginning of vintage were the most suitable for fermentation of these musts to obtain wines of a desired quality. KMD

OILS AND FATS

445 SENDRA (JM) and CUNAT (P). Volatile constituents of the essential oil of Spanish origanum. I. Hydrocarbons and lightly oxygenated compounds. *Rev. Agroquim. Tecnol. Aliment.* 19(1); 1979; 102-18 (Spanish)

The essential oil of Spanish origanum was first fractionated by column chromatography and preparative GLC. The fractions were then studied by a GLC-MS method, which revealed the presence of 43 different compounds, of which 32 have been reported for the first time as being present in origanum

oil: they are 7 monoterpene hydrocarbons, 8 sesquiterpene hydrocarbons, 12 oxygenated monoterpenes, and 5 aliphatic oxygenated compounds. KMD

446 HASAN (SQ), AHMAD (I), SHERWANI (MRK), ANSARI (AA) and OSMAN (SM). Studies on herbaceous seed oils. X. *Fette Seifen Anstrichm.* 82(5); 1980; 204-5

Fatty acid composition of six species belonging to different less familiar plant families was determined by making use of chromatographic and spectroscopic techniques. All species were found to have high iodine values, out of which one species showed iodine value above 180. The total of "linolenic" and "linole ic" acids varied from 66.1 to 74.8%. Four species (*Passiflora foetida*, *Chrozophora plicata*, *Salvia plebeia* and *Fimbristylis quinqueangularis*) deserve agronomic evaluation as the first species that resemble Safflower (especially grown in tropics) and the latter three species yield linoleic rich seed oils. AA

447 INDIRA RAJA (M) and DEVARAJAN (L). A note on the chemical characteristics of some vegetable oils. *Madras Agric. J.* 68(1); 1981; 68-70

Eight vegetable oils collected from the market have been analysed for acid value, saponification value, Reichert-Meiss value, polenske value, iodine number and average molecular weight. MVG

448 ANON. Determination of olive oil quality with the Spectracomp 601 spectrophotometer. *Ind. Aliment.* 19(172); 1980; 401-4 (Italian)

The operation of the spectrophotometer Spectracomp 601, manufactured by Carlo Erba Strumenzione, has been described in detail. It can be used to detrmine the U-V absorption of olive oil. If one employs the automatic analytic procedure which simplifies the determination of ΔK, and eliminates operational errors - the instrument can be used as a reference instrument. KMD

449 ADAM (O), WOLFRAM (G) and ZOLLNER (N). Effect of dietary fat on plasma level of lecithin, lysolecithin and sphingomyelin in man. *Fette Seifen Anstrichm.* 82(5); 1980; 187-9 (German)

Reduction of fat content of the diet leads to a decrease in total phosphatide level in plasma, mainly due to alteration in the lecithin fraction. The level of lecithin in experimental humans fed a formula diet containing 25% of the total energy as fat was distinctly lower than to those fed 33% of the total energy as fat (with the P/S quotient at a fat level of 33% of total energy). At a fat level of 25% of total energy, modification of the fat components did not alter the serum lecithin level to a statistically significant extent. The plasma level of lysolecithin decreased with reduction in the proportion of dietary fat, however, it did not vary with different types of fat. The level of sphingomyelin was almost the same for the two formula diets and it did not vary either by reduction in the proportion of fat or by modification of the fat components. AA

450 SHUKLA (VKS), CLAUSEN (J), EGSGAARD (H) and LARSEN (E). The content of fat and polyenoic acids in the major food sources of the arctic diet. Localization of double bonds in fatty acids by means of mass spectrometry of fatty acid pyrrolidides. *Fette Seifen Anstrichm.* 82(5); 1980; 193-9 (German)

The fatty acid pattern of muscle and fat tissue of the arctic seal, birds and mammals are presented and compared with fatty acid pattern of the corresponding tissues of domestic animals normally used as meat sources in Western countries. The data indicated that the fat tissue from the seal is the major source of polyenoic acids i.e. tri- and pentaenoic acids in the diet of the arctic hunter. These acids are derived metabolically from linolenic acid. In contrast polyenoic acids i.e. linoleic acid and its deriva-

tives in the nonarctic diet is mainly supplied from muscle tissue of non-ruminant animals as well from the sources of vegetable origin. The fat content of muscle tissue in the arctic animals was not lower than that of domestic meat. The data presented are related to recent studies of the apparent low incidence of coronary heart diseases in arctic populations. AA

451 ANEJA (R), BHATI (A), HAMILTON (RJ), PADLEY (FB) and STEVEN (DA). Determination of the fully saturated triglyceride composition of fats. *J. Am. Oil. Chem. Soc.* 57(4); 1980; 135-9

452 BAILEY (AV), BOUDREAUX (GJ) and SUMRELL (G). Preparation of some fatty glycolic acid derivatives and screening for antimicrobial activity. *J. Am. Oil Chem. Soc.* 57(4); 1980; 139-41

Nine glycolic acid derivatives were prepared and screened as primary plasticizers for polyvinyl chloride (PVC) and for antimicrobial activity. Two types of compounds were represented: (a) those with a methyl or ethyl ester grouping at the carboxyl function of glycolic acid and a fatty acyl group at the hydroxy function; and (b) those with three acyl groups attached at the hydroxyl functions of the amide, resulting from the reaction of glycolic acid and diethanolamine. None of the compounds was compatible with PVC at the 35% level of incorporation, and the compounds were not further evaluated as plasticizers. They were screened for antimicrobial activity against a gram-positive bacterium, *Staphylococcus aureus;* a gram-negative bacterium, *Escherichia coli;* a yeast, *Candida utilis;*and a mold, *Penicillium* sp. Six of the compounds inhibited two or more of the test organisms suggesting some of these materials merit further testing as biostatic agents. AA

SPICES AND CONDIMENTS

453 HUNTANEN (CN). Inhibition of *Clostridium botulinum* by spice extracts and aliphatic alcohols. *J. Food Prot.* 43(3); 1980; 95-6, 200

Alcoholic extracts of spices were prepared and tested for inhibition of *Clostridium botulinum* in culture media. Mace (the outer covering of the seed of *Myristica fragrans*) and achiote (annato, *Bixa orellena*) were the most inhibitory of 33 spices studied. Also quite active were bay leaf (*Laurus nobilis*), white and black pepper (*Piper nigrum*) and nutmeg the seed of M. *fragrans*). Less active were rosemary (*Rosmarinus officinalis*), clove (*Eugenia caryophyllata*), oregano (*Oreganum vulgare*), turmeric (*Circuma longa*), thyme (*Thymus vulgaris*), and paprika (*Capsicum annuum*). Of the series C_1 to C_{18}, aliphatic straight chain alcohols of C_{14} or C_{16} chain-lengths were the most inhibitory against *C. botulinum* with a minimum inhibitory concentration (MIC) of 0.6 ppm. A plot of alcohol chain length versus MIC showed a highly significant ($P < 0,01$) cubic function. AA

SENSORY EVALUATION

454 PARLIMENT (TH). The chemistry of aroma. *Chemtech.* 10(5); 1980; 284-9

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

455 DEB (DC) and CHAKRAVORTY (S). Effect of a juvenoid on the growth and differentiation of the ovary of *Corcyra cephalonica* (Lepidoptera). *J. Insect.Physiol.* 27(2); 1981; 103-11

456 LACEY (J), HILL (ST) and EDWARDS (MA). Microorganisms in stored grains: Their enumeration and significance. *Trop. Stored Prod. Inf.* No.39; 1980; 19-33

457 HODGES (R). Arthropod pests of stored products: Collection, preservation and dispatch for identification. *Trop. Stored Prod. Inf.* No.39; 1980; 39-41

458 OSUJI (FNC). Observations on beetles attacking dried yams and yam flour from three Nigerian markets. *Trop. Stored Prod. Inf.* No.39; 1980; 35-8
Ten different beetle species were recorded in dried yam and yam flour purchased from local markets in Ibadan, oyostate, liorin and idofin-igbona in Nigeria. The most abundant beetle species cigarette beetle (*Lasioderma sericorne* Fab.) (Coleoptera, Anobiidae) and *Dinoderus porcellus* (Coleoptera, Bostrychidae). BSN

459 HUSSAIN (MA), OLOFFS (PC), BLATHERWICK (FJ), GAUNCE (AP) and MacKENZIE (CJG). Detection of incipient effects of anticholinesterase insecticides in rats and humans by electromyography and cholinesterase assay. *J. Environ. Sci. Health.* B. 16(1); 1981; 1-19

460 SHARIATPANAHI (M), ANDERSON (AC), ABDELGHANI (AA), ENGLANDE (AJ), HUGHES (J) and WILKINSON (RF). Biotransformation of the pesticide sodium arsenate. *J. Environ. Sci. Health.* B 16(1); 1981; 35-47

BIOCHEMISTRY AND NUTRITION

461 LIST (D) and KNECHTEL (W). The determination of ascorbic acid by means of immobilized ascorbate-oxidase. *Flussiges obst.* 47(2); 1980; 57-61 (German)
The column reactor has been found to be most suitable for a rapid determination of the quantity of 1-ascorbic acid. The immobilized enzyme ascorbate-oxidase loses about 50% of its activity as against a half-life period which is much larger than that of the soluble enzyme. A citrate phosphate buffer solution with a pH value of 5.6 is used as a solvent; the measuring range of 0.1-2.0 µg is registered photometrically at 265 nm. The disadvantage of the activity loss during immobilization is compensated by the increased stability. VR

462 McINTOSH (CE). Food and nutrition problems associated with natural diasters. *Cajanus.* 13(1); 1980; 18-27

463 AMERICAN DIETETIC ASSOCIATION. Nutrition and physical fitness. *J. Am. Dietet. Assoc.* 76(5); 1980; 437-43

464 RINGROSE (H). Can a nutrition policy be made to work? *Food Nutr. Notes. Rev.* 36(4); 1979; 160-62

465 GRACEY (M). Nutritional problems of Australian aboriginal children. *Food Nutr. Notes. Rev.* 36(4); 1979; 165-7

466 GUERI (M). The role of the nutrition officer in disasters. *Cajanus.* 13(1); 1980; 28-41

467 GUERI (M). Some economic implications of breast feeding. *Cajanus.* 13(2); 1980; 85-94

468 SUHARYONO. Infant feeding in diarrhoeal and other enteric disorders. *Neth. Milk Dairy J.* 35(1); 1981; 7-18

This paper is a compilation of a 12-year study on infant feeding in diarrhoeal and other enteric disorders. The selected topics are breast feeding versus artificial feeding, the malabsorption syndrome and the application of infant milk formulae for refeeding post-gastroenteritis and other enteric disorders. AA

469 SAI (FT). Infant and child feeding. A challenge to governments and industry. *Neth. Milk Dairy J.* 35(1); 1981; 19-21

TOXICOLOGY AND HYGIENE

470 STEWART (BJ), EYLES (MJ) and MURRELL (WG). Rapid radiometric method for detection of *Salmonella* in foods. *Appl. Environ. Micribiol.* 40(2); 1980; 223-30

A radiometric method for the detection of *Salmonella* in foods has been developed which is based on *Salmonella* poly H agglutinating serum preventing *Salmonella* from producing $^{14}CO_2$ from (^{14}C) dulcitol. The method will detect the presence or absence of *Salmonella* in a product within 30 hours compared to 4 to 5 days by routine culture methods. The method has been evaluated against a routine culture method using 58 samples of food. The overall agreement was 91%. Five samples negative for *Salmonella* by the routine method were positive by the radiometric method. These may have been false positives. However, the routine method may have failed to detect *Salmonella* due to the presence of large numbers of lactose-fermenting bacteria which hindered isolation of *Salmonella* colonies on the selective agar plates. AA

471 PIERSON (MD), SMOOT (LA) and VANTASSELL (KR). Inhibition of *Salmonella typhimurium* and *Staphylococcus aureus* by butylated hydroxyanisole and the propyl ester of p-hydroxybenzoic acid. *J. Food Prot.* 43(3); 1980; 191-4

Results of this study indicate that BHA (Butylated hydroxyanisole) is more effective than propylparaben in inhibiting of growth of *S. aureus* and *S. typhimurium* in tryplicase soy broth (TSB). A combination of 50 ppm of BHA propylparaben was needed to produce a gradual reduction in viable cells of *S. aureus* and 150 ppm of each additive caused *S. typhimurium* to exhibit an apparent decrease in cell numbers and then led to limited growth. VR

472 MEDWID (RD) and GRANT (DW). Inactivation of *Staphylococcal thermonuclease* by an enzyme-like factor produced by *Streptococcus faecalis* subsp. *liquefaciens*. *J. Food Prot.* 43(3); 1980; 201-2

473 ROBACH (MC) and STATELER (CL). Inhibition of *Staphylococcus aureus* by potassium sorbate in combination with sodium chloride, tertiary butylhydroquinone, butylated hydroxyanisole or ethylenediamine tetraacetic acid. *J. Food Prot.* 43(3); 1980; 208-11

474 NEELAKANTAN (S), BALASUBRAMANIAN (T), INDIRA JASMINE and BALASARASWATHI (R). Presence of aflatoxins in foods and feeds available in the Tamil Nadu region. *Madras Agric. J.* 68(3); 1981; 189-95

Various food products (Groundnut candy, dates, arecanut, pickles, dried vegetables, apples and dried coconut) and feeds procured from local market were analysed for aflatoxin content by TLC. Results showed that several samples were found to be contaminated by aflatoxin B_1 and/or B_2. Similar results were also obtained with animal feed ingredients. MVG

475 CHIPLEY (JR) and URAIH (N). Inhibition of *Aspergillus* growth and aflatoxin release by derivatives of benzoic acid. *Appl. Environ. Microbiol.* 40(2); 1980; 352-7

476 LIN (YC), AYRES (JC) and KOEHLER (PE). Influence of temperature cycling on the production of aflatoxins B_1 and G_1 by *Aspergillus parasiticus*. *Appl. Environ. Microbiol.* 40(2); 1980; 333-6

The effect of temperature cycling on the relative productions of aflatoxins B_1 and G_1 by *Aspergillus parasiticus* NRRL 2999 was studied. The cycling of temperature between 33 and 15 C favoured aflatoxin B_1 accumulation, whereas cycling between 25 and 15 C favoured aflatoxin G_1 production. Cultures subjected to temperature cycling between 33 and 25 C at various time intervals changed the relative productions of aflatoxins B_1 and G_1 drastically. Results obtained with temperature cycling and yeast extract-sucrose medium with ethoxyquin to decrease aflatoxin G_1 production suggest that the enzyme system responsible for the conversion of aflatoxin B_1 to G_1 might be more efficient at 25 C than at 33 C. The possible explanation of the effect of both constant and cycling temperatures on the relative accumulations of aflatoxins B_1 and G_2 might be through the control of the above enzyme system. The study also showed that >57% of aflatoxin B_1, >47% of aflatoxin G_1, and >50% of total aflatoxins (B_1 plus G_1) were in the mycelium by day 10 under both constant and cyclic temperature conditions. AA

477 STOLOFF (L). Aflatoxin M in perspective. *J. Food Prot.* 43(3); 1980; 226-30

The steps are presented from the discovery of aflatoxin M_1 in the milk of a cow fed "toxic" peanut meal to the determination of its relation to aflatoxin B_1, and the relation of aflatoxin M_1 to other animal metabolites of aflatoxin B_1. Estimates from controlled studies are given of the level and amount of Aflatoxin M_1 to be expected in the milk of cows exposed to aflatoxin B_1 in their feed, followed by numerous survey results that corroborate the conclusion from the experimental estimates: levels of aflatoxin B_1 in uncontrolled dairy ration ingredients are sufficiently high to result in measurable aflatoxin M_1 (>0.1 ng/ml) in commercial milk supplies. Because the Food and Drug Administration has been unable to prevent occurrence of aflatoxin M_1 in milk in the United States by attempting to control the feed, an administrative guideline has been established at 0.5 ppb for aflatoxin M_1 in fluid milk products; consideration is being given to related guidelines for products manufactured from milk. AA

478 LORKOWSKI (G). Inhibitory action of citrinin on cultural hepatoma cells, *Food Cosmet. Toxicol.* 18(5); 1980; 489-91

479 LATHIA (D) and FRENTZEN (U). Synergistic effect of chlorogenic acid and thiocyanate on *in vitro* formation of N-methyl-N-nitroso-aniline under physiological conditions. *Food Cosmet. Toxicol.* 18(5); 1980; 463-5

Both chlorogenic acid, a phenolic component of coffee, and thiocyanate (present in the saliva of smokers) catalyzed the formation of N-methyl-N-nitroso-aniline (NMNA) from nitrite, *in vitro*. Used together, the two compounds had a cumulative effect on the reaction. KMD

480 PHILLIPS (BJ), KRANZ (E) and ELIAS (PS). An investigation of the genetic toxicology of irradiated foodstuffs using short-term test systems-II. Sister chromatid exchange and mutation assays in cultured chinese hamster ovary cells. *Food Cosmet. Toxicol.* 18(5); 1980; 471-5

The results showed no evidence of genetic toxicity induced in food by irradiation. The general applicability of cell culture tests to the detection of mutagens in food is discussed. AA

481 CHVEDOFF (M), CLARKE (MR), IRISARRI (E), FACCINI (JM) and MONRO (AM). Effect of housing conditions on food intake, body weight and spontaneous lesions in mice. A review of the literature and results of an 18-month study. *Food Cosmet. Toxicol.* 18(5); 1980; 517-22

Mice were housed in groups of one, two, four or eight cage for 18 months. The more densely housed groups showed markedly reduced food consumption, slightly decreased mean-body weights, and a smaller variance of body weights. Tumour incidence was not affected, but gastritis was more prevalent in the more densely housed groups. AA

482 HAYDEN (BJ), BETTLEHEIM (KA) and WILSON (MW). Investigation into an outbreak of food poisoning. *J. Hyg.* 85(3); 1980; 327-30

GENERAL

779 RAEUBER (HJ) and NIKOLAUS (H). Structure of foods. *J. Texture Stud.* 11(3); 1980; 187-98

A general classification scheme is proposed which recognizes organizational, architectural and relative meanings of food structure and how these relate to textural properties. Within the architectural (or constructive) meaning, one can recognize certain elementary structures which give rise to homogeneous or heterogeneous compounded structures, and permeated or embedded types. Depending on the level of magnification needed, one can also speak of macro-, micro-, and ultrastructures. Specific examples are given and the relationship between structure and processing is pointed out. AA

780 ROSSI (F de). The containers for liquid food. Situation and prospects. *Ind. Aliment.* 19(169); 1980; 85-98 (Italian)

781 ASHBY (BH). Developments in frozen food transport. *Food Technol.* 35(3); 1981; 67-70

Evolution of frozen food transport, current and future developments, and the development of models for highway, rail, ocean and air transport are covered. KAR

782 FARKAS (DF). New concepts for expanding and improving frozen preservation techniques. *Food Technol.* 35(3); 1981; 63-5

783 HIRONO (I), HOSAKA (S), UCHIDA (E), TAKANASHI (H), HAGA (M), SAKATA (M), MORI (H), TANAKA (T) and HIKINO (H). Safety examination of some edible or medicinal plants and plant constituents. Part 3. *J. Food Safety.* 2(4); 1980; 205-11

784 ANON. Food labelling II: Continuing the detailed review of the Food Standards Committee Report on food labelling. *Br. Food J.* 82(897); 1980; 97-100

This article covers fish, dried foods intoxicating liquors, processed peas milk, butter and cream, and some miscellaneous matters. KAR

785 VOGEL (K). Possibilities for saving energy costs. *Getreide Mehl. Brot.* 34(4); 1980; 94-7 (German)

786 GARG (HP), BANDYOPADHYAY (B) and SHARMA (VK). Conventional solar air heater. *Invent. Intell.* 16(9); 1981; 418-21

787 CHALAPATIRAO (G). Economic plant designs for bio-gas production. *Invent. Intell.* 16(9); 1981; 412-4

FOOD PROCESSING AND PACKAGING

788 SCHULTZ-PISZACHICH (W), VONDRAN (J), BEICHE (W) and KUNIS (J). Temperature behaviour during unsteady heat conduction and phase change. *Lebensmittel-Industrie.* 27(5); 1980; 203-6 (German)

A calculation model is developed to ascertain the temperature behaviour as a function of place and time for cooling processes with phase change. In this connection the temperature dependence of the thermophysical indices is

considered. Three fields of application for the appropriate solution algorithms are defined to detect the physico-technical process. The advantage of the described model is demonstrated by an example in the field of food technology. A comparison of the measurements shows the degree of accuracy. A calculation programme is available in PL/1. AA

PACKAGING

789 GIACIN (JR). Evaluation of plastics packaging materials for food packaging applications: Food safety considerations. *J. Food Safety.* 2(4); 1980; 257-76
Discusses: Criteria for selection of food packaging system; relationship to public safety; migration of hazardous components from packaging systems to food; migration of food additives into foods and their physico-chemical aspects; and linear migration model. BSN

790 ANON. Flexible packaging. *Packag. Eng.* 26(3); 1981; 31-5

791 ANON. Sealing, hot-stamp systems improve nut packaging. *Packag. Eng.* 26(3); 1981; 65

792 ANON. Two-compartment structure: Single carton provides multiple uses. *Packag. Eng.* 26(3); 1981; 76-7

793 NARAYANAN (PV). Deterioration of materials and preventive measures. *Perfectpac.* 21(6/7); 1981; 5-11
The author has reviewed elaborately physical factors like heat, light, dust, chemical factors, such as, moisture and gases or vapours; and biological agents comprising microorganisms and insects, in the deterioration of packaging materials. KMD

794 VAN OETEREN (KA). Processes for corrosion protection. *Fette Seifen Anstrichm.* 82(6); 1980; 249-54

FOOD ENGINEERING AND EQUIPMENT

795 ANON. Nut sets off massive Australian mill explosion. *Indian Miller.* 12(2); 1981; 11-9
Possible causes for a severe dust explosion occurred in an Australian mill have been analysed and recommendations made to prevent such explosions. The main factor contributing to the explosion was the construction of the plant and the recommendations primarily concern modifications in its design. MVG

796 PERSSON (P), ARVIDSSON (O) and ODEEN (K). Fire risks and fire prevention in cold stores. *Int. J. Refrig.* 3(5); 1980; 295-8
The factors governing damage in cold store fires are examined. Since the value of the contents is normally several times that of the building, priority should be given to saving the contents. Cold store designs with this aim are reviewed, together with the shortcomings of the insurance provision. Suggestions are made for constructive action by the IIR to reduce fire losses. AA

797 SAHAGUN (JF) and HARPER (JM). Effects of screw restrictions on the performance of an autogenous extruder. *J. Food Process. Eng.* 3(4); 1981; 199-216

The Brady Crop Cooker is a low-cost autogenous extruder capable of manufacturing products suitable for human consumption in less developed countries (LDC). Versatility is achieved by the design of the extruder which directly affects its operation. One such design aspect is the inclusion of internal screw channel restrictions. The effects of location and number of restriction on operation and product quality were studied. Results indicated that restrictions affected the location of the mechanical energy input and of temperature profiles along the screw. Increasing the number of restrictions also promoted cleavage of starch molecules due to the resulting higher shear in the screw channel. AA

798 KEILMANN (F), BOHME (D) and SANTO (L). Multichannel photometer-nephelometer. *Appl. Environ. Microbiol.* 40(3); 1980; 458-61

FOOD CHEMISTRY AND ANALYSIS

799 HASTY (RA), LIMA (FJ) and OTTAWAY (JM). Bromate oxidation of methyl orange. Part II. Effect of bromide and application to the determination of bromine. *Analyst.* 106(1258); 1981; 76-84

800 READMAN (JW), BROWN (L) and RHEAD (MM). Use of stop-flow ultraviolet scanning and variable-wavelength detection for enhanced peak identification and sensitivity in high-performance liquid chromatography. *Analyst.* 106(1258); 1981; 122-6

801 PRIMO (J), GALLART (J) and BENEYTO (E). A new adsorbent for thin layer and column separations. Preparation and chromatographic characteristics. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 393-400 (Spanish)

In order to find an adsorbent for chromatography, able to keep away some problems found in the separation of insect juvenile hormone mimetics and pheromones, we have prepared an aluminium-magnesium metasilicate that turns out to be very suitable for thin layer and column separations. Some physico-chemical characteristics of the product, the adequate conditions for its use and its behaviour in the separation of some phenol and amines mixtures, have been determined. Good results have been reached, with adequate separation degrees, in both thin layer and column chromatography. AA

802 THOMPSON (M), GOULTER (JE) and SIEPER (F). Laser ablation for the introduction of solid samples into an inductively coupled plasma for atomic-emission spectrometry. *Analyst.* 106(1258); 1981; 32-9

803 GROSS (MO), RAO (VNM) and SMIT (CJB). Rheological characterization of low-methoxyl pectin gel by normal creep and relaxation. *J. Texture Stud.* 11(3); 1980; 271-90

804 NEWKIRK (DR) and SHEPPARD (AJ). High pressure liquid chromatographic determination of cholesterol in foods. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 54-7

A high pressure liquid chromatographic method that uses the benzoate ester of cholesterol has been developed for the measurement of cholesterol in foods. A 300 x 3.9 mm id μBondapak C_{18} column and a variable wavelength ultraviolet detector are used with a 100% methanol mobile phase. Amounts as low as 10 ng cholesterol benzoate can be detected. The results from the analyses of a variety of foods are given and compared with results from gas-liquid

chromagographic analyses. The comparison of the 2 chromatographic techniques is favourable. AA

805 BERTENSHAW (MP), GELSTHORPE (D) and WHEATSTONE (KC). Determination of lead in drinking water by atomic-absorption spectrophotometry with electrothermal atomisation. *Analyst.* 106(1258); 1981; 23-31

A simple, sensitive method for the determination of lead in drinking water by electrothermal atomisation has been described. A lanthanum pretreatment technique was employed to overcome suppressive interference effects. The limit of detection was less than 1.0 μg^{-1} with a total standard deviation of less than 1.5 μg^{1-1} or 10% of concentration in range of 0-100 μg^{1-1} for both automated and manual injection of the sample. BSN

806 FISCHER (PW) and L'ABBE (MR). Acid digestion determination of iodine in foods. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 71-4

A method for determining iodine in food is described. The samples were digested using a mixture of sulphuric, nitric, and perchloric acids. The iodine was determined by an automated colorimetric method based on the iodide-catalyzed reduction of Ce^{+4} by As^{+3}. For milk samples, the relative standard deviation for the method was less than 3%, and the recovery of ^{125}I added to milk and carried through the method ranged from 96 to 102%. The method was compared with 4 other procedures and was superior to alkaline dry ashing methods. AA

807 HORWITZ (W). Analytical methods for sulphonamides in foods and feeds. I. Review of methodology. *J. Assoc. Off. Anal. Chem.* 64(1); 1980; 104-30

Sulphonamides are an important class of antibacterial compounds used in veterinary practice and animal production. A number of specific compounds are approved for use in certain species under limitations requiring withdrawal long enough to eliminate the residues from edible tissues. In most cases, the legal tolerance is 0.1 ppm. This residue is measured in regulatory laboratories by a modified Bratton-Marshall procedure of solvent extraction, transfer to an acid solution, removal of potentially interfering amines by extraction from basic solution, diazotization of the sulphonamide in a reacidified solution, and spectrophotometric measurement of the developed colour. The tissue metabolites of the sulphonamides are usually the parent compound and the N^4-acetyl derivative, which is hydrolyzed to the parent compounds by evaporation of the extracting solvent in the prescence of acid. The only collaborative studies which have been performed on methods for veterinary sulphonamides involve their determination as additives to feeds at levels of the order of magnitude of 100 ppm. Recoveries (94-103%) are satisfactory for the collaborative studies available. The reproducibility coefficient of variation of 5% is satisfactory for sulphaquinoxaline, sulphaguanidine, sulphanitran, and sulphamethazine; the 13% coefficient of variation for sulphadimethoxine is not satisfactory, indicating that the method for this compound needs improvement. No collaborative studies have been performed on tissue residue methods. Therefore the between-laboratory variability and the susceptibility to outliers of the method used to enforce residue tolerances are unknown. Based upon within-laboratory studies, however, it appears that all of the diazotization-based methods are being operated close to their limit of reliable determination, a poor analytical practice.

Current methodological approaches utilize gas chromatography, high pressure liquid chromatography, and even gas chromatography-mass spectrometry with an isotopically labeled internal standard. None of these proposed methods have yet reached the stage of collaborative studies for either feeds or tissues. In this discussion of analytical methods for sulphonamides, an introductory

section covering the regulatory aspects and chemical properties of sulphonamides is followed by three main sections: first general problems, including sampling and sample preparation, extraction, protein precipitation cleanup, emulsions, colour reactions, confirmation of identity, interferences, and sulphonamide metabolites, second, collaboratively studied methods of analysis including methods for feeds, concentrates and premixes, and tissues, and statistical parameters; and last other available analytical methods, including methods in the Food Additives Analytical Manual, validation studies for New Animal Drug Applications, the Tishler method, methods for sulphonamides a contaminants in feeds, methods involving chromatography, polarography, and automation, and prespective methods. AA

FOOD MICROBIOLOGY

808 GHAI (SK), AJIT SINGH and KALRA (MS). SCP production from rice stover: solid state vs. submerged fermentation. *Indian J. Exp. Biol.* 19(1); 1981; 61-4

Rice stover, i.e. stalk and leaves of the rice plant left after harvest, was delignified with NaOH and used as a substrate for single cell protein (SCP) production. Submerged cultivation of *Myrothecium verrucaria* was 1.8-2.9 times more efficient (for various protein production parameters) than the solid state fermentation. Trends in the production of carboxymethyl cellulase; cellobiase, and residual reducing sugars during the course of fermentation were also studied. The biomass contained all the essential amino acids except cysteine. The amino acid pattern of SCP compared well with the FAO standards for food and feed proteins. KMD

MUSHROOM

809 MIDDLEBROOK (PL). Growing methods and developments in the 80's. *Mushroom J.* No.98; 1981; 47-53

810 MacCANNA (C) and DAWSON (WM). An economic comparison of mushroom growing systems. *Mushroom J.* No.100; 1981; 117-29

811 SIVAPRAKASAM (K) and KANDASWAMY (TL). Waste materials for the cultivation of *pleurotus sajor-caju*. *Mushroom J.* No.101; 1981; 178-9

812 BINNS (ES). Mushroom sciarids - their larval ecology. *Mushroom J.* No.103; 1981; 227-31

FOOD ADDITIVES

813 HALLADAY (SC), RYERSON (BA), SMITH (CR), BROWN (JP) and PARKINSON (TM). Comparison of effects of dietary administration of butylated hydroxytoluene or a polymeric antioxidant on the hepatic and intestinal cytochrome P-450 mixed function-oxygenase system of rats. *Food Cosmet. Toxicol.* 18(6); 1980; 569-74

The antioxidant D00079 is a divinyl benzene-hydroquinone phenols condensation polymer which is being developed for use in foods. D00079 has no effect on MFO systems, while BHT produces significant liver enlargement and enzyme induction. AA

814 GREEN (U), SCHNEIDER (P), DEUTSCH-WENZEL (R), BRUNE (H) and ALTHOFF (J). Syncarcinogenic action of saccharin or sodium cyclamate in the induction of bladder tumours in MNU pretreated rats. *Food Cosmet. Toxicol.* 18(6); 1980; 575-9

The potential of saccharin, sodium cyclamate or calcium carbonate to promote bladder cancer was investigated. Single doses of 2 mg N-methyl-N-nitrosourea (MNU) were instilled into the bladders of female rats. There was no significant difference betweeen any of the groups in average survival time, bodyweight gain or food intake. All the MNU treated groups developed urinary-tract neoplasms, but there were no significant differences in tumour incidence between the MNU treated groups and the combined treatment groups. AA

815 OBIEDZINSKI (MW), WISHNOK (JS) and TANNENBAUM (SR). N-Nitroso compounds from reactions of nitrite with methylamine. *Food Cosmet. Toxicol.* 18(6); 1980; 585-9

N-Nitrosodimethylamine (NDMA) is formed when methylamine is reacted with acidic nitrite. Higher yields of NDMA are obtained at pH 5 than at pH 2; the reaction is catalysed by thiocyanate and by formaldehyde, and the effectiveness of these catalysts is also pH-dependent. N-Nitrosomethylmethoxymethylamine is also obtained when the reaction is carried out in the presence of formaldehyde. AA

816 DeSIENA (A), JACOBS (E) and ROMAGNOLI (R). Determination of trace amounts of nitrites in fabricated non meat products. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 226-7

Low levels of nitrite (1-5 ppm) contributed by raw materials in new fabricated food products were successfully determined by a modification of an AOAC method for processed meats. Recoveries were greater than 90% for composite samples to which 5-10 ppm nitrite had been added. This method allows analyses of fabricated food products containing hydrogenated vegetable oils, soy proteins, and dried egg whites for low levels of nitrite. AA

817 KURECHI (T), KIKUGAWA (K) and KATO (T). Effect of alcohols on nitrosamine formation. *Food Cosmet. Toxicol.* 18(6); 1980; 591-5

Alcohols such as ethanol, methanol, n-propanol, isopropanol and sucrose in high concentrations inhibited the formation of N-nitrosodimethylamine or N-nitrosodiethylamine from sodium nitrite and the appropriate dialkylamine at pH 3.0 but enhanced the reaction at pH 5.0. Similarly, alcoholic drinks such as whisky, Japanese sake, and wine inhibited nitrosamine formation at pH_3 and enhanced it at pH_5. Inhibition at pH_3 may have been due to the transformation of nitrite into inactive nitrite esters of the alcohols. The reasons for enhancement at pH_5 are obscure, since the nitrite esters could not nitrosate the amines nor catalytically activate the nitrosation at this pH. The effects of the alcohols on nitrosation were different from their effects on azo-dye formation, which was inhibited by ethanol and isopropanol at both pH3 and pH5. AA

818 BEDOUKIAN (PZ). The future of flavours: A growing science. *Perfum. Flavor.* 6(1); 1981; 13-4

819 COULSON (J). Food colours - A balanced view. *Food Flavour. Ingred. Packag. Process.* 3(2); 1981; 14-7,23

Discusses: appreciation of colour; natural colours; grape sources; beetroot red; nature-identical colours; synthetic organic colours; inorganic colours; food colour legislation; and current trends. BSN

820 SABIR (DM), EDELHAUSER (M) and BERGNER (KG). Isolation of food colourants means of wood and polyamide powder. *Dtsch. Lebensmittel-Rundschau.* 76(9); 1980; 314-7 (German)

An explanation is given of the tying of acid synthetic food colourants to polyamide when isolated from aqueous solutions. In neutral and acid solutions, sulfonized colourants are present as anions. They are ionically bonded through positively charged groups of the polyamide; final fixation of the colourant to the polyamide is effected through additional binding powers. The positive charging-up of the polyamide is pH dependent. In a neutral or weakly acid environment, the primary amino end groups of the polyamide chains are being protonized under pH 2.5, protonization starts on the carbonyl oxygen of the peptide bonds. Experiments described exhibit the pH dependent sorbent behaviour and the active part played by the amino end groups of the polyamide. AA

821 PUTTEMANS (ML), DRYON (L) and MASSART (DL). Ion-pair high performance liquid chromatography of synthetic water-soluble acid dyes. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 1-8

The ion-pair chromatography of food dyes is studied in 2 reverse phase HPLC systems. Tetrabutylammonium is used as counter ion in the mobile phase. In the first system, a C_{18} stationary phase and water-methanol eluants, the influence of methanol content and counter ion concentration was investigated. The second system, 1-pentanol coated on hydrophobic support as the stationary phase, gave higher retention times than did the first system with similar counter ion concentrations. The two systems complement each other and permit the complete separation of all dyes investigated. AA

822 OPDYKE (DLJ). Monographs on fragrance raw materials. *Food Cosmet. Toxicol.* 18(6); 1980; 649-81

CEREALS

823 MUHLBAUER (W). Trends with grain drying in the Federal Republic of Germany. *Getreide Mehl Brot.* 34(4); 1980; 85-90 (German)

In the Federal Republic of Germany the drying, as usual, represents a bottleneck in the grain production, since the number of available drying plants and their efficiency could not cope with the harvest capacity. Furthermore, the demand for energy for drying plants is too high and the quality of the dried material does not correspond fully to the requirements of the processing industry. Attempts are being made to develop efficient drying plants. Alternative sources of energy are being sought to replace the fossil fuels used in drying, which would cut down the costs to a minimum. Thorough studies must be made for developing an optimum drying process for grains with reference to efficiency, energy requirement, and maintenance of the quality of the dried material. The relationship between the thermal treatment and the biochemical reactions that contribute to quality changes in grains have to be examined in this context. VR

824 PATON (D) and SPRATT (WA). Simulated approach to the estimation of degree of cooking of an extruded cereal product. *Cereal Chem.* 58(3); 1981; 216-20

The simulation method is based on the analysis of the viscosity curves of known mixtures of precooked and uncooked starch when heated to 97 C, followed by cooling at RT. Curve shape differences may be readily identified by recording viscosity directly against temperature with the Ottawa starch viscometer and an X-Y recorder. The area difference between cooling and heating curves between Y axis and the curve intersection point increases, thereby indicating the increase in uncooked starch in the mixture. Upto 30% uncooked starch in the mix data can be best expressed by a power equation, $Y = ax^b$. BSN

825 SPICHER (G) and PETERS (H). Investigations for standardising the determination of bacterial count in grain and grain products. Part 4. Use of different culture substrates for the determination of coliform bacteria. *Getreide Mehl. Brot.* 34(4); 1980; 101-4

A comparative study has been undertaken of four different selective media used for the detection of coliform bacteria in fodder and cereals. The API20E system is used to differentiate bacteria. The highest count of coliforms was obtained with laurylsulfate Bouillon. The counts determined using brilliant green galle lactose broth culture, Macconkey broth culture, and fuchsin lactose broth were also in the same range. *Escherichia coli* was detected in all the four selective media in equal measure. VR

RICE

826 BARBER (S). The quality of the rice grain, in plant improvement programmes. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 314-26 (Spanish)

The quality of the rice grain that is produced is slowly acquiring greater importance in plant improvement programmes. The author has listed the quality attributes that are usually taken into account in plant breeding experiments. He has also discussed several methods of evaluating the quality of rice grains that are being standardized: (1) degree of polishing; (2) alkali disintegration test; (3) determination of starch; (4) gel consistency test; and (5) an instrumental method for measuring the texture of the cooked grain which includes a reference procedure for the controlled cooking of rice grains. KMD

827 ANTHONY RAJ (S), VENKATESAN (V), SINGARAVADIVEL (K) and VASAN (BS). Improvement in the conventional parboiling of rice through prevention of husk opening. *J. Food Sci. Technol. (India)* 18(6); 1981; 252-4

Salt solution of 16% concentration with different methods of application and mixing with dry salt at 0.5-5.0% levels (weight basis) was attempted to prevent husk opening and exposure of kernels during steaming in parboiling of 1 R 20 variety of paddy. Use of 0.5 to 1.0% salt as dry mix completely prevented husk opening in 4 varieties of paddy. Salt treated paddy dried faster than conventionally parboiled grains in sun-drying. Salt treated paddy got evenly milled and had a 'pearly' appearance and was free from mould infection. A slight increase (0.1 to 0.4%) in milling out turn was also noted with salt treated (0.8% treatment) paddy. KAR

828 ZAKIUDDIN ALI (S) and BHATTACHARYA (KR). Pasting behaviour of parboiled rice. *J. Texture Stud.* 11(3); 1980; 239-45

Parboiling seemed to produce significant changes in the pasting behaviour of rice. But comparison of Brabender viscograms obtained at a fixed slurry concentration did not provide a clear understanding of the changes. Study of

viscograms of a number of differently parboiled samples determined at several slurry concentrations each indicated that the viscogram patterns were essentially similar in all respects except one: The lowest peak viscosity at which a measurable breakdown first appeared was pushed towards higher viscosity values and higher concentrations in parboiled rice, proportional to its severity, as compared to raw rice. This suggested a decreased swelling ability of the granules in parboiled rice as compared to raw rice. AA

829 VIJAYALAKSHMI (G), DWARAKANATH (CT) and SREENIVASA MURTHY (V). Studies on *Bacillus cereus* contamination of rice and rice preparations. *J. Food Sci. Technol. (India)*. 18(6); 1981; 231-4

Raw rice (117 samples), long and short varieties of parboiled rice (12 samples), cooked rice 7 samples) and 4 samples each of rice preparations like (i) pongal (ii) coconut rice (iii) vegetable bath (iv) bisibele bath (v) lime rice (vi) tamarind rice and (vii) curd rice were collected from homes, commercial establishments and departmental canteens in Mysore City (India) and assessed for bacterial and *Bacillus cereus* contamination immediately and after incubation for 13 and 26 hours. *B. cereus* contamination was observed in >50% of samples; cooked rice stored for 12 hours also showed varying levels of contamination. All the rice preparations showed varying levels of *B. cereus* contamination, the highest being in (ii) and lowest in (vii). Kinetic studies done using vomitting type strain of *B. cereus* (F 4810) indicated that unpolished rice and long variety parboiled rice provided slightly better growth than polished rice and short variety parboiled rice. Seven log difference in *B. cereus* count has been found in 6 hours incubated rice preparations having pH in the range of 5.1-7.8. Among (v)-(vii) (low pH rice preparations), only (v) showed steady growth rate whereas, (vii) indicated negative trend. KAR

WHEAT

830 JAHN-DEESBACH (W), SEIBEL (W) and LUDEWIG (H-G). Suitability of wheat varieties for the production of confectionary goods. Part 1: Influence of N-fertiliser on the processing properties of a few winter wheat varieties. *Getreide Mehl Brot.* 34(4); 1980; 106-11 (German)

The influence of Nitrogen fertiliser on the properties of wheat flour of type 550 and the planned Ea type 2 has been evaluated for the production of confectionary goods. An increase in raw protein content and sedimentation value are observed with increase in levels of nitrogen fertiliser. A general increase of baking suitability of flour for the production of bread and other fine confectionary goods is achieved with increased nitrogen fertilisation. The change in starch quality which dependent on the fertiliser, is of greater significance. VR

831 GHILDAYAL (NP), RAMAKRISHNA (SV), NIRMALA DEVI (P), LONSANE (BK) and ASTHANA (HN). Large scale production of pectolytic enzyme by solid state fermentation. *J. Food Sci. Technol. (India)* 18(6); 1981; 248-51

Pectolytic enzyme was produced on large scale by solid state fermentation using *Aspergillus carbanerius* CFTRI 1048 strain on wheat bran medium. Effect of fermentation time (upto 25 hours), temperature (chamber temperature 26-26.5 C) and tray temperature (30 C), steaming and sterilization of bran, on production of enzyme and the influence of extraction temperature of enzyme recovery were assessed. Fermentation for 121 hours with a tray temperature (30 C), steaming and sterilization of bran, on production of enzyme and the influence of extraction temperature of enzyme recovery were assessed. Fermentation for 21 hours with a tray temperature of 30 C gave maximum production of enzyme.

Steaming of wheat bran at 15 pa for 45 minutes is needed to get good results. Extraction of enzyme by water from mouldy bran at 25-28 C and clarification of the enzyme by plate and frame filter press gives satisfactory results. The enzyme can be precipitated using ethanol with a contact time of 5 minute (tried up to 6 hours) and the optimum concentration of ethanol in enzyme alcohol mixture needed for maximum recovery is 50% (concentration tried 30-70%). Precipitation at 4 C gave 25% more enzyme recovery than at 25-28 C. The enzyme precipitate when suspended in buffer of pH 7, lost its activity rapidly at 25-28 C and at 4 C; the dried powder lost about 6.5% activity in 37 days, whereas the original extract when stored for 37 days lost 8% of its activity. KAR

832 BONGIRWAR (DR), PADWAL-DESAI (SR), SUDHA RAO (V), VAKIL (UK) and SREENIVASAN (A). Semi-pilot scale studies on wheat disinfestation by gamma radiation. *J. Food Sci. Technol. (India)* 18(6); 1981; 225-31

A semi-pilot scale study on disinfestation of wheat by gamma-irradiation was undertaken to ascertain the feasibility of the process. Wheat was deliberately infested with *Rhizopertha dominica* and *Tribolium* spp and irradiated with 30 krad (0.3 kGy) dose in a through flow irradiator or conventionally fumigated with phostoxin (9 g/t) for 120 hours and compared with untreated control, at regular intervals of 1 month during 10-month storage period. In irradiated wheat, the insects were destroyed instantly and there was a complete inhibition of development of all the metamorphic stages of the insects at later stages, whereas in unirradiated and fumigated wheat, they rapidly proliferated. Single radiation treatment was found to be as effective as three doses of fumigations. Irradiation is comparable to fumigation on costwise basis also. KAR

833 ANON. Analysis of first break milling of hard and soft wheats. *Indian Miller.* 12(2); 1981; 5-9

The breaking patterns of Australian variety of hard (Eagle) and soft (Olympics) wheat in a roller mill were investigated using high speed cinematography. The hard wheat was soon to shatter into large regular pieces with little release of fine particles; the soft wheat deformed and burst into many fine particles. It was also noticed that soft grains enter further into the nip before initial rupture illustrating their more plastic nature. The average residue time at the nip was 0.0088 s for hard wheat and 0.010 s for soft wheat. Microscopic study of first break streams sieved through 9XX silks, showed that the hard eagle wheat was composed mainly of angular material which cleaned neatly along the lines of the cell walls. Many endosperm cells could be found in it. On the other hand, the olympic soft wheat was mainly a collection of broken cell fragments and fine starch granules with very little recognisable endosperm cells. The deformation of soft wheat was due to its mealy, non-vitreous endosperm, the mealymen being attributed to the presence of air spaces , which may act as an air cushion to allow deformation as also transmitting the applied, crushing force hydrostatically throughout the endosperm rather than in just the plane in which it is applied. This possibly explains why soft wheats burst to produce relatively large amounts of small particles when passing through the first break. MVG

834 KOSMOLAK (FG) and DYCK (PL). Milling and baking qualities of ten spring wheat cultivars from the People's Republic of China. *Cereal Chem.* 58(3); 1981; 246-7

835 HARIDAS RAO (P). Recent advances in characterisation and functionality of wheat flour proteins. *Indian Miller* 12(2); 1981; 21-39

The review covers the content and composition of protein, gluten characteristics and composition, different methods of protein estimation, protein

quality testing methods based on chemical and rheological methods, wheat protein characteristics compared to other cereal proteins; characteristics protein that influence mixing, and baking and bread making qualities and recent methods to evaluate the baking quality of wheat. MVG

836 MacRITCHIE (F). Flour lipids: Theoretical aspects and functional properties. *Cereal Chem.* 58(3); 1981; 156-8
Discusses: effect of lipid components; lipid-protein interaction in flour quality; and role of lipids in stability of gas cell structure of dough. BSN

837 SCHEIDL (I), PFANNHAUSER (W) and WOIDICH (H). Gas chromatographic determination of pyrethrin residues in flour samples. *Dtsch. Lebensmittel-Rundschau.* 76(9); 1980; 309-11 (German)
The determination of pyrethrins in flour is described. The cleanup is carried out on a Florisil column and two fractions containing pyrethrins I & II are collected. The substances are quantitated by gas chromatography using an electron capture detector. The detection limit is 0.01 ppm. AA

OAT

838 BIERMANN (U), WITTMANN (A) and GROSCH (W). Occurrence of bitter hydroxy fatty acids in oat and wheat. *Fette Seifen Anstrichm.* 82(6); 1980; 236-40 (German)
Water suspensions of oat, soft wheat and durum wheat flours were incubated for 4.5 hour at 38 C. Only oat flour became intensely bitter. Freeze dried samples of the incubated flours were analysed for free hydroxy fatty acids with bitter taste. 750 µg/g L.OH (mixture of 9-hydroxytrans, cis-10,12 Octa-decadienoic acid and 13 hydroxy-cis, trans-9,11 Octadecadienoic acid) and 62 µg/g Tri-OH (mixture of 9,12,13-trihydroxy trans-10 octadeenoic acid and 9,10,13, trihydroxy trans 11-octadecenoic acid) were found in oat flour. Soft wheat flour contained the same amount of Tri OH of oat flour, but only. 60 µg/g LOH were detected. Both LOH and Tri-OH (20 µg/g and 15 µg/g respectively) were found in durum wheat flour. AA

RYE

839 BOISEN (S) and DJURTOFT (R). Trypsin inhibitor from rye endosperm: purification and properties. *Cereal Chem.* 58(3); 1981; 194-8

840 CHANG (O-R) and TSEN (CC). Isolation of trypsin inhibitors from rye, triticale, and wheat samples. *Cereal Chem.* 58(3); 1981; 207-10

841 CHANG (O-R) and TSEN (CC). Characterisation and heat stability of trypsin inhibitors from rye, triticale, and wheat samples. *Cereal Chem.* 58(3); 1981; 211-3

842 WEIPERT (D) and ZWINGELBERG (H). Pentosan/starch ratio in rye flours of different quality. *Getreide Mehl Brot.* 34(4); 1980; 97-100 (German)
Pentosan/starch ratio in rye flours of different quality has been studied. As is known, it was confirmed that a good rye should have a starch/pentosan ratio of 16:1. The pentosans absorb water and together with the starch included in them, they take over some of the load placed on the free starch. Thus, the crumb structure of bread prepared from rye flour that has significant quantities of damaged starch, can be improved by the addition of a pentosan rich fraction. VR

MILLETS

PEARL MILLET

843 PRUTHI (TD). Free fatty acid changes during storage of bajra (*Pennisetum typhoideum*) flour. *J. Food Sci. Technol. (India)* 18(6); 1981; 257-8

Bajra flour was stored (i) as such (moisture content 12.0%) and (ii) after heating at 100 C for 2 hours (moisture content 1.5%(for 8 weeks. Free fatty acids (as oleic acid) was 59.2% in (i) and 25.2% in (ii) after 8 weeks of storage. KAR

SORGHUM

844 EARP (CF), AKINGBALA (JO), RING (SH) and ROONEY (LW). Evaluation of several methods to determine tannins in sorghums with varying kernel characteristics. *Cereal Chem.* 58(3); 1981; 234-8

Polyphenols (tannins) in 21 sorghum cultivars with differing pericarp colour and presence or absence of a pigmented testa were analyzed by seven methods: Prussian blue, vanillin hydrochloric acid (V-HCl) with and without blanks (20-minute extraction), modified vanillin hydrochloric acid (MV-HCl) with and without blanks (20 minute extraction), MV-HCl (24 hour extraction), and α-amylase inhibition. Subtraction of blanks in the V-HCl and MV-HCl procedures reduced the overall level of polyphenols measured without changing the relative quantities. Significant levels of polyphenols and amylase inhibition were found only in those cultivars with a spreader gene and a phenotypically brown pericarp, whether the pericarp was genetically red or white. When the methods were used to measure polyphenols in the sorghums with a brown pericarp, coefficients of variation (CV) were 9.5,8.0,8.2,11.2 and 13.0% and F values with 9 and 14 degrees of freedom (df) were 105.8,206.6,191.5,149.9 and 72.4 for Prussian blue. V-HCl with blanks, V-HCl without blanks, MV-HCl with blanks, and MV-HCl without blanks, respectively. The CV was 2.7% and the F value with 8 and 7 df was 1735.71 for MV-HCl (24 hour extraction). The CV was 25.3% and the F value with 10 and 21 df was 20.60 for the α-amylase inhibition method. Correlations among methods ranged from 0.85 to 0.99. The MV-HCl (24 hour) had the highest F value and lowest CV but is not recommended because of the long extraction period. The V-HCl method with or without blanks is recommended as the most reliable for analysing polyphenols in sorghum because they have the next highest F values and lowest CV. The method with the highest F value should be the most sensitive to detecting levels of polyphenols due to genetic variation. AA

MAIZE

845 MILLER (BS), HUGHES (JW), ROUSSER (R) and BOOTH (GD). Effects of modifications of a model CK2 stein breakage tester on corn breakage susceptibility. *Cereal Chem.* 58(3); 1981; 201-3

The modifications involved an improved impeller assembly, thicker, longer and harder blades, and a stainless steel cup. These modifications were incorporated into a modified model of CK2-M stein breakage tester. The modified instrument doubled the breakage of brekage-prone corn and lessened the time required to determine the percentage of breakage. BSN

846 FREEMAN (CC). New brine saturation method for extraction of light filth from corn meal: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 191-3

An improved method has been developed for extracting light filth from corn meal. The proposed method uses only tap water, salt, olive oil, and alcohol, eliminating the need for costly and toxic solvents for the separation. Reports from 8 collaborators showed that recovery was 95.8% for insect fragments and 84.3% for rodent hairs by the proposed method, as compared with 90.6 and 88.6%, respectively, by the official method. The proposed method has been adopted as official first action to replace official method 44.042 for corn meal only. AA

847 CONTRERAS (G), ELIAS (LG) and BRESSANI (R). Limitations of corn (*Zea mays*) and common bean (*Phaseolus vulgaris*) diets as protein and calorie sources. *Qualitas Plantarum.* 30(2); 1980; 145-53

Mixtures of 70:30 and 87:13 of corn and beans with or without vitamins, minerals, limiting amino acids and calories were fed to 5 week old pigs to determine performance and efficiency of utilization. After 12 weeks, it was shown that increasing the bean ratio from 87:13 to 70:30 (corn:beans) was a desirable measure as was the simultaneous supplementation with the other nutrients; individual groups of nutrients resulted in partial improvement in animal performance. None of the diets used was capable of inducing growth similar to the control groups fed a corn:soya diet. Results confirm the importance of total nutrients to obtain increased efficiency of protein utilization; furthermore, diets, such as the corn/bean diets studied, need to be improved in relation to both quality and quantity of protein. AA

BARLEY

848 ROTH (NJL), WATTS (GH) and NEWMAN (CW). Beta-glucanase as an aid in measuring neutral detergent fiber in barley kernels. *Cereal Chem.* 58(3); 1981; 245-6

PULSES

849 VANDERSTOEP (J). Effect of germination on the nutritive value of legumes. *Food Technol.* 35(3); 1981; 83-5

Effect of germination on proximate composition, protein quantity and quality, vitamins, minerals, and antinutritional factors are the topics covered. KAR

850 HAYTOWITZ (DB), MARSH (AC) and MATHEWS (RH). Contents of selected nutrients in raw, cooked and processed legumes. *Food Technol.* 35(3); 1981; 73-4

Few items prepared from legumes have been discussed in a very general way with respect to mineral and amino acid contents. KAR

851 HALABY (GA), LEWIS (RW) and REY (CR). Nutrient content of canned legumes. *Food Technol.* 35(3); 1981; 86-8

852 ROCKLAND (LB) and RADKE (TM). Legume protein quality. *Food Technol.* 35(3); 1981; 79-82

Nutritional quality of dry bean proteins, influence of cooking and processing, protein digestibility and enhancement of nutritional properties are the aspects covered. KAR

853 PRUTHI (JS), KALRA (CL), MANAN (JK) and RAINA (BL). Studies on the physico-chemical composition and formulation of quality standards for traditional savoury foods. Part II. Phul wadian, Mukand wadian and other savoury foods. *ISI Bull.* 33(8); 1981; 294-300

Proximate chemical composition of some traditional savoury foods like *Phul wadian*, *Mukand wadian* (both fried and unfried) and salted, spiced and fried Bengal gram dal, Masoor dal, black gram dal and mixed namkeen purchased from the local market has been studied. Results show that unfried *Mukand wadian* was a fair source of protein and dried *Mukand wadian* and *Phul wadian* were poor protein sources. Deep fat fried products (salted or spiced) were however, good protein sources. Based on the above results, draft quality standards for *Mukand wadian* (fried and unfried) have been suggested. MVG

854 SOTELO (A), ARTCAGA (ME), FRIAS (MI) and GONZALES-GARZA (M). Cytotoxic effect of two legumes in epithelial cells of the small intestine. *Qualitas plantarum.* 30(2); 1980; 79-85

In vitro tests showed that the viability of the cells was much more affected by Escumite bean extract than by the chick-pea extract ($P < 0.001$), which became much diminished when the epithelial cells were treated with Escumite extract ($P < 0.001$), instead of the chick-pea extract. *In vivo* experiments confirmed these findings. The present results suggest that the deleterious effect of some toxicants present in the raw legume is due to an interaction with intestinal epithelium, which, in turn, may cause a reduced absorption of nutrients. VR

MUNGBEAN

855 NOOR (MI), BRESSANI (R) and ELIAS (LG). Changes in chemical and selected biochemical components, protein quality, and digestibility of mung bean (*Vigna radiata*) during germination and cooking. *Qualitas plantarum.* 30(2); 1980; 135-44

The effect of germination on the nutritive value of mung beans (*Vigna radiata*) was studied in raw and cooked samples after 0,2 and 4 days of germination. Water content increased, but crude protein, lipids, crude fiber, ash and carbohydrates decreased with germination. Trypsin inhibitor activity did not change significantly while hemagglutinins were absent. Essential amino acids (methionine, tryptophan and lysine) decreased with germination. Net protein ratio (NPR) and protein efficiency ratio (PER) in rats decreased with germination especially in cooked sprouts. True digestibility did not change consistently due to germination or cooking. In conclusion, loss of protein quality in mung beans occurs upon germination and cooking. AA

PIGEONPEA

856 SINGH (U) and JAMBUNATHAN (R). Protease inhibitors and *in vitro* protein digestibility of pigeonpea (*Cajanus cajan* (L.) Mill sp.) and its wild relatives. *J. Food Sci. Technol. (India)* 18(6); 1981; 246-7

7 wild relatives and cultivated species of *Cajanus* were studied for the trypsin and chymotrypsin inhibitor activities and for the *in vitro* digestibility of seed proteins. The trypsin inhibitor activity was generally higher in the wild species. A clear difference in the chymotrypsin inhibitor activity was observed between the wild and the cultivated species. The highest trypsin and chymotrypsin inhibitor activities were observed in *Rhynchosia rothi*; only exception was *A. cajanifolia* in which the inhibitor activities were similar

to those in the cultivated species. *Rhynchosia rothi* showed the lowest value for *in vitro* protein digestibiliy. Otherwise, no large differences were observed in protein digestibility for the wild and cultivated species. AA

HARICOT BEAN

857 AUGUSTIN (J), BECK (CB), KALBFLEISH (G) and KAGEL (LC). Variation in the vitamin and mineral content of raw and cooked commercial *Phaseolus vulgaris* classes. *Food Technol.* 35(3); 1981; 75-6

Commercial classes of *Phaseolus vulgaris* growing in different areas of USA were analysed before and after cooking for amino acids and mineral content and the results are discussed. KAR

858 CARPENTER (KJ). The nutritional contribution of dry beans (*Phaseolus vulgaris*) in perspective. *Food Technol.* 35(3); 1981; 77-8

Nutritive value with respect to amino acid and mineral content, rat feeding experiment results and value of bean for infants and young children have been discussed. KAR

OILSEEDS AND NUTS

GROUNDNUT

859 VELU (V) and RAMANATHAN (G). Influence of calcium and iron on the yield and quality of groundnut. *Oils Oilseeds J.* 34(1); 1981; 23-6

Application of Ca to groundnuts grown in pots significantly increased the pod and kernel yield of groundnut and the shelling percentage of the pods, while application of Fe did not affect the yield significantly. Interaction between the treatments was insignificant. Application of both Ca and Fe had a marked and significant effect in increasing the crude protein content of the kernels, but had no effect on either the oil content, or the quality of oil (iodine value, acid value). KMD

860 WELLS (JM). Toxigenic fungi isolated from late-season pecans. *J. Food Safety.* 2(4); 1980; 213-20

Of 1978 fungal colonies isolated on malt-salt agar from twenty 5 kg samples of pecans harvested late in the season , 39% were *Cladosporium*, 21% were *Penicillium*, 9% were *Alternaria* or *Epicoccum*, 8% *Pestalotia* or *Monochaeta*, 4% *Trichothecium*, 4% *Aspergillus niger*, and less than 2% were *Fusarium*, *Phomopsis*, *Rhizopus*, *Aspergillus*, and miscellaneous genera. Forty-four of 260 representative isolates were persistently toxic to day-old cockerels. Toxigenic *Penicillium* spp. included *P. citrinum*, *P. terrestre*, *P. cyclopium*, *P. funiculosum*, *P. roquefortii*, *P. purpurogenum*, *P. rubrum*, and *P. rugulosum*. Toxigenic isolates of other genera included *Aspergillus flavus*, *A. cervinus*, *Alternaria alternata*, *Trichothecium roseum*, *Pestalotia* sp., and *Fusarium* spp. Additional key words are *Carya illinoensis*, mycotoxins. AA

COCONUT

861 LIYANAGE (AW), HETTIARACHCHI (MR) and JAYATISSA (PM). Yeasts of coconut and palmyrah palm wines of Sri Lanka. *J. Food Sci. Technol. (India)* 18(6); 1981; 256-7

20 strains of yeasts from coconut palm wine and 3 strains from palmyrah palm wine produced in Sri Lanka were isolated by direct plating and were characterised and identified by biochemical and morphological characteristics. The yeasts belonged to *Saccharomyces* (20 strains), *Schizosaccharomyces* (1 strain) and *Candida* (1 strain). Predominant spp. were *S. marxianus* (11 strains) and *S. exiguus* (9 strains). KAR

862 SUSAMMA PHILIP, MENON (MR) and ALICE ABRAHAM. Quantitative changes in the amino acids of copra due to fungal infection. *J. Food Sci. Technol. (India)* 18(6); 1981; 254-5

Copra was sterilized and inoculated with naturally infesting organisms including *Aspergillus niger*, *Asp. flavus*, *Rhizopus oryzae*, *Mucor hiemalis*, *Penicillium citrinum*, *Botryodiplodia theobromae* and *Curuvularia senegalensis* and the changes in the amino acid content was noted after incubation for one month. Samples inoculated with *B.theobromae* did not show any alteration in amino acid composition, whereas those with *M. hiemalis* and *C. senegalensis* recorded lower content and *R. oryzae* higher quantities of amino acids. Amino acid content of *Asp. niger* infected sample was comparable to control, except for the higher contents of hydroxy proline, threonine, glycine, valine and isoleucine. Arginine content was reduced in all crops. KAR

JOJOBA

863 CLARKE (JA) and YERMANOS (DM). Jojoba-variability in oil content and composition in a collection of 1156 native plants. *J. Am. Oil Chem. Soc.* 57(6); 1980; 176-8

Data are presented on the oil content and composition in the seeds of 1156 native jojoba plants harvested individually from inland and coastal areas of California and Arizona in the U.S. and from Sonora and Baja California in Mexico. The mean oil content of these samples was 53.2%; 34.2% of the samples exceeded 53%. The mean single seed weight was 0.56g. A significant correlation between single seed weight and oil content was found, but there was no correlation between oil content of the seed and seed yield per plant. Analysis of the oil for fatty acids and fatty alcohols showed very little variability among samples. This compositional uniformity is a major asset in terms of industrial application of this oil. Half the seeds studied in 144 samples had a mean oil content of 49.5% and mean single seed weight of 0.39 g. Simple correlations between fatty acids and oil content were similar to those reported earlier. AA

SUNFLOWER

864 CASPER (HH), BACKER (LF) and KUNERTH (W). Survey of North Dakota sunflower seeds for aflatoxin. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 228-30

COTTONSEED

865 GAD (TE) and EL-ZALAKI (EM). Total Gossypol content and properties of cottonseed oil as affected by borax treatment before and after oil storage. *Fette Seifen Anstrichm.* 82(6); 1980; 228-32

Storage of crude cottonseed oil resulted in colour reversion and the stored oil had a very dark colour which rendered it difficult to refine and to bleach even when treated with borax after storage. Treatment with borax decreased the total gossypol content of the oil by 94.6-99.3%. No undesirable effect due to borax treatment, was detected either on the physical or on the chemical properties. VR

SOYABEAN

866 NODA (F), HAYASHI (K) and MIZUNUMA (T). Antagonism between osmophilic lactic acid bacteria and yeasts in brine fermentation of soy sauce. *Appl. Environ. Microbiol.* 40(3); 1980; 452-7

867 MARABLE (NL), TODD (JM), KORSLUND (MK) and KENNEDY (BW). Human urine and/or plasma levels of methionine, methionine sulphoxide and inorganic sulphate after consumption of a soy isolate: A preliminary study. *Qualitas Plantarum.* 30(2); 1980; 155-61

In a preliminary study, three human subjects consumed 35 or 70 g of a commercially available soy isolate containing 298 or 596 mg of methionine sulphoxide. Methionine sulphoxide appeared in human plasma within one hour after consumption of the isolate. This observation suggests rapid absorption by humans of this oxidized form of methionine. Plasma levels of sulphoxide as determined in one subject returned to zero within 24 hours of consumption of the isolate. Ingested methionine sulphoxide was excreted in the urine in free form in very small quantities relative to intake. These results are consistent with, but of course do not prove, utilization of methionine sulfoxide as a methionine replacement in human subjects. AA

868 AJAYI (OA). Metabolic responses of adult men to a daily magnesium intake of 430 mg from vegetable proteins. *Qualitas Plantarum.* 30(2); 1980; 109-15

The retention of magnesium from low intakes of vegetable protein provided by four combinations of soya and groundnut nitrogen was studied in seven adult males. About 52% of the dietary magnesium was excreted in the urine during each experimental period, with marked variation ($P < 0.005$) among the subjects. Fecal magnesium accounted for 60% of the dietary intake. Magnesium balance was negative for most subjects throughout the experimental period. The possible effects of nitrogen retention on magnesium utilization is discussed. VR

CRAMBE

869 GOULD (DH), GUMBMANN (MR) and DAXENBICHLER (ME). Pathological changes in rats fed the crambe meal-glucosinolate hydrolytic products, 2S-1-cyano-2-hydroxy-3, 4-epithiobutanes (Erythro and threo) for 90 days. *Food Cosmet. Toxicol.* 18(6); 1980; 619-25

2S-1-cyano-2-hydroxy-3,4-epithiobutanes (erythro and threo) isolated from the seed of crambe abyssinica, were fed to groups of six weanling rats at levels of 0,75,150 or 300 ppm in the diet for 90 days. The higher dose groups showed poor growth and increased serum levels of alkaline phosphatase, total bilirubin, glutamic oxaloacetic, transaminase, glutamic-pyruvic transaminase

and ornithine carbamyl transferase. The severity and occurrence of renal and hepatic lesions were dose-dependent and similar in many respects to those that preceded tumour development in animals after exposure to a number of carcinogenic agents. KMD

TUBERS AND VEGETABLES

870 BUTLER (JB) and PIRIE (NW). An improved small scale unit for extracting leaf juice. *Exp. Agric.* 17(1); 1981; 39-47

A small unit for separating juice from which 5 to 10 kg of leaf protein could be made in a day has been modified to make it more efficient and convenient for use. AA

871 BAJAJ (KL) and KAUR (G). Spectrophotometric determination of L-ascorbic acid in vegetables and fruits. *Analyst.* 106(1258); 1981; 117-20

L-ascorbic acid in fruits and vegetables in determined by titrimetry, spectrophotometry and molybdophosphate complex with Folin-ciocaltcu reagent. Reducing agents in fruits and vegetables interfere with ammonium molybdate and Folin-ciocaltca reagent, As such a modified ammonium molybdate method is described, whereby the interference is minimised. The method has been found suitable for fruits and vegetables containing between 10 and 300 mg of L-ascorbic acid/100 g fresh sample. BSN

POTATO

872 NAIR (PM), BEHERE (AG) and RAMASWAMY (NK). Glycoalkaloids of *Solanum tuberosum* Linn. *J. Sci. Ind. Res.* 40(8); 1981; 529-35

Aspects covered in the review include types of Solanum alkaloids; biosynthesis of solanidine; incorporation of intermediates into solanidine; factors responsible for the formation of solanine in potatoes and the control of this process; mode of toxic action; and glycoalkaloids and disease resistance in potato, cultivars. MVG

CARROT

873 BAJAJ (KL), KAUR (G) and SUKHIJA (BS). Chemical composition and some plant characteristics in relation to quality of some promising cultivars of carrot (*Daucus carota* L.). *Qualitas Plantarum.* 30(2); 1980; 97-107

Twenty three cultivars of carrot (*Daucus carota* L.) roots were analysed for various chemical constituents. The dry matter content varied from 7.92% (Indian yellow carrot) to 11.18% (kurna). β-carotene content varied from 0.85 (yellow carrot) to 8.50 mg/100 g. The total water soluble carbohydrates ranged from 2.62% (Nantes PBC) to 6.25% (yellow carrot). The phenolic content varied from 43.61 mg/100 g (Royal chautenay) to 86.40 mg/100 g (Nantes Tropical). A significant positive correlation between β-Carotene content and number of days to reach maturity was observed. VR

874 KOZLOWSKI (AV). Must every vegetable be blanched before being deep-frozen? *Gordian.* 80(6); 1980; 138-40 (German)

There will be no difference between a blanched and unblanched, deep-frozen vegetable only if the raw material and the freezing process employed are identical. Moreover, the unblanched vegetable must be prepared in such a

way that its cooking time is the same as that of the blanched vegetable. Blanching is not necessary for some types of vegetables, including a few salad vegetables, as the quality is not improved by heat treatment. But many vegetables, and leafy vegetables in particular, must be blanched so as to inactivate the enzymes, and eliminate undesirable taste components. KMD

875 LIN (JK) and YEN (JY). Changes in the nitrate and nitrite contents of fresh vegetables during cultivation and post-harvest storage. *Food Cosmet. Toxicol.* 18(6); 1980; 597-603

Nitrate and nitrite levels in both germinating seeds and growing vegetables were determined for the following vegetables; short-petioled cabbage (*Brassica chinensis*), long-footed cabbage (*Brassica chinensis* variety *communis*) field mustard (*Brassica campestris*), broad-leaf mustard (*Brassica juncea* variety *rugosa*) and water convolvulus (*Ipomoea aquatica* Forsk). In view of the effect of dietary nitrate on salivary nitrite formation and on the endogenous formation of carcinogenic N-nitroso compounds, the authors suggest that more effort should be put into developing methods of cultivating low nitrate vegetables. AA

CABBAGE

876 SRISANGNAM (C), HENDRICKS (DG), SHARMA (RP), SALUNKHE (DK) and MAHONEY (AW). Effects of dietary cabbage (*Brassica Oleracea* L.) on the tumorigenicity of 1,2-dimethylhydrazine in mice. *J. Food Safety.* 2(4); 1980; 235-45

ALFALFA

877 ACOSTA (J), ZAMORA (S) and LOPEZ (MA). The influence of some technological processes on lucerne digestion by sheep. Sites of digestion of dry matter, organic matter and energy. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 401-7 (Spanish)

The effect of drying, grinding, pelleting and heating lucerne on the sites of digestion of the dry matter, organic matter and energy was studied in sheep fitted with rumen cannulae, T shaped cannulae in the proximal deodenum and re-entrant cannulae in terminal ileum. Total digestibility of the dry matter, organic matter and gross energy was similar for all four diets. Most of the digestible dry matter, organic matter and energy were lost in reticulorumen. When the pelleted diet was heated (180 C 25 minute), its digestion and absorption approaches that of and for fresh and hay diets. Reduced ruminal fermentation was concomitant with increased digestion in caecum and colon and also with changes in absorption at the small intestine. Both mechanisms were apparent when the pelleted diet was studied. AA

ARTICHOKE

878 BERMELL (S), MORELL (J) and CARRASCO (JM). Pollutional levels in the liquid wastes from vegetables canning industries II. Artichokes, green beans, asparagus and pimiento. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 349-54 (Spanish)

Pollutional levels of the liquid wastes from vegetable canning industries (artichokes, green beans, asparagus and Pimiento) has been studied. Parameters considered have been: biochemical oxygen demand (BOD_5), chemical oxygen demand (COD), total and fixed suspended solids (TSS and FSS) and pH. Mean

values for these parameters are in the following intervals: BOD_5, 65.7,100; COD, 87-8,760; TSS,0-1,860; FSS, 0-1,641 and pH, 6-9, 7 AA

LENTIL

879 EL-NAHRY (FI), MOURAD (FE), ABDEL KHALIK (SM) and BASSILY (NS). Chemical composition and protein quality of lentils (Lens) consumed in Egypt. *Qualitas Plantarum.* 30(2); 1980; 87-95

Three local cultivars of lentil (Lens) seeds (Giza 9, Family 91 and Family 195) as well as one imported Pakistani variety were studied. Moisture, protein, fat, carbohydrate, ash, fiber, thiamine, riboflavin, amino acids and some protein fractions were determined on the unpeeled and peeled seeds. The protein quality was evaluated by determining the protein efficiency ratio, net protein utilization, biological value and true digestibility coefficient. All components increased as a result of peeling except the ash, the fiber content, and the residual nitrogen content of the insoluble protein fraction. The latter was markedly decreased by peeling. Giza 9 lentil seeds were found to contain the highest protein and thiamine contents. They showed the highest protein quality and proved to be nutritionally superior to other varieties. Generally, the three local cultivars were found to be chemically and biologically superior to the imported Pakistani cultivar. AA

FRUITS

880 NAVILLE (R). The French market for tropical and sub-tropical fruits in 1979. *Fruits.* 35(3); 1980; 187-96 (French)

881 PHAN (PA) and MIMAULT (J). Effects of freezing and thawing on fruit. Evaluation of some texture parameters and exudate. Relation to fruit quality. *Int. J. Refrig.* 3(5); 1980; 255-60 (French)

The quality of Granny Smith apples and Clingstone peaches (variety Vivian) was evaluated by measuring colour, flavour and texture both before and after freezing and thawing. The Kramer shear press was used to measure texture. Other factors examined include exudate after thawing and total sugar content of the juice. It was found that stress strain diagrams give a significant measure of texture which correlate with other quality factors. Quick freezing associated with thawing in a microwave oven shows a significant improvement. AA

882 WROLSTAD (RE) and SHALLENBERGER (RS). Free sugars and sorbitol in fruits. A compilation from the literature. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 91-103

The glucose, fructose, sucrose, and sorbitol content of apple, pear, plum, cherry, grape, strawberry, raspberry, blackberry, and peach fruit was compiled from the literature; their range, mean, standard deviation, and percent coefficient of variance were calculated. The individual fruits have characteristic patterns relating to their sorbitol content, glucose; fructose ratio, and sucrose content which are influenced to only a small degree by variety, season, or geographic origin. Processing in many cases has a marked effect on sucrose content. AA

883 GUEGOV (J). Influence of cold storage on the cryoscopic temperature of some fruit species. *Int. J. Refrig.* 3(4); 1980; 230-4

The influence of a three month storage period on the freezing point of two

cultivars of apple, three cultivars of pear, and of one cultivar of grapes, has been studied. It has been shown statistically that the freezing points of fresh and stored fruits, of the same soluble solids content, differ. For apples and pears, which mature during cold storage, the cryoscopic temperatures are higher for the stored fruits by about 0.35 C. For grapes which do not mature during cold storage, these temperatures for the stored fruits are lower, by about 0.5 C. Apples ripen during storage, grapes do not, pears will not ripen at cold storage temperature, which has to be raised to a higher temperature after storage. AA

BLACK BERRY

884 DENT (RG). Extraction of thrips and other whole or equivalent insects from frozen blackberries and raspberries. Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 194-5

BANANA

885 ANON. The banana trade in some West European countries. *Fruits.* 35(2); 1980; 126-8 (French)

886 DEULLIN (R). Electrical conductance of the banana skin, a physical characteristic that can be used for the better determination of the evolution of the fruit. *Fruits.* 35(5); 1980; 273-81 (French)

The electrical conductivity of banana skin increases as the fruit develops on the plant. It diminishes rapidly during the preclimacteric phase - a fact which provides us with a usable quantitative method of following the evolution of the fruit between harvest and the start of maturation. It may be noted that, at the present time, there are no known criteria of banana development during this phase. The electrical conductivity of banana skin affected by cold (breaking) is greatly reduced; this provides us a quantitative method of measuring a change that is currently assessed only by subjective and qualitative observations. The measurement of skin conductivity does not involve destruction of the test sample. KMD

887 ISRAELI (Y), GAZIT (S) and BLUMENFELD (A). Influence of relative humidity on the type of flower in the "Cavendish" banana. *Fruits.* 35(5); 1980; 295-9

CITRUS

888 CADILLAT (R). Note on the trade in citrus and exotic fruits during the off-season of 1978. *Fruits.* 35(4); 1980; 205-16 (French)

889 MUNOZ-DELGADO (JA). Application of refrigeration in citrus marketing. *Int. J. Refrig.* 3(5); 1980; 279-87 (French)

The factors and operations that can influence the quality characteristics of citrus fruits before, during and after harvesting, as well as the evolution of these characteristics during the subsequent refrigerated distribution are reviewed. Special consideration is given to fungicidal post-harvest treatments as well as to degreening, and the most recommendable products, doses, residues and application techniques are indicated. The effects of precooling, storage (temperature, relative humidity, air circulation and change, stacking) and transport conditions, are considered together with the influence of the

concentration of oxygen and carbon dioxide in the storage atmosphere on the preservation of the most important citrus species. AA

890 GAUR (A) and CHENULU (VV). Post infection changes in ascorbic acid content in fruits of *Citrus reticulata* L. induced by *Cladosporium sphaerospermum* Penz. and *Fusarium moniliforme* Sheldon. *Curr. Sci.* 50(19); 1981; 861;

Influence of fruit rot caused by *Cladosporium sphaerospermum* and *Fusarium monoliforme* on ascorbic acid content of oranges was studied. The loss of vitamin C on the 15th day of inoculation with the pathogens was 93.6% with *C. sphaerospermum* and 92.1% with *F. monoliforme* as compared to 25.3% in fresh fruit which was due to over ripening. The rate of loss was found to be gradual during the incubation period, but the rate of decrease was much faster in injected fruits. MVG

891 CUANT (P), GARRO (R) and MONCHOLI (V). Strains of *Citrus tristeza* virus in Spain. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 339-48 (Spanish)

892 TANAKA (A), NOSE (N), HIROSE (A) and WATANABE (A). Application of an improved steam distillation procedure in residue analysis. Part II. Determination of 2-phenylphenol in citrus fruits by a spectrophotometric method. *Analyst.* 106(1258); 1981; 94-9

2-phenylphenol is used in several countries as a fungicide to prevent rotting in citrus fruits during transport and storage. This compound reacts with NN-diethyl-p-phenylene-diomine and potassium haxacyanoferrate in alkaline solution to produce an indophenol dye. Citrus oils could be removed by steam distillation, while in grape fruit, orange and lemon,it could be measured quantitatively by spectrophotometry. Recoveries ranged between 92.5-98.8% with a detection limit of 0.31 ppm. The method has been found suitable for routine analysis. BSN

893 CUNAT (P) and HERNANDEZ (R). Sanitization of the conditioning rooms for citrus fruits, for marketing. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 292-7 (Spanish)

Citrus fruits can be attacked by spoilage organisms even after they have been treated with fungicides. Hence certain sanitation measures are called for in the entire chain of handling, storage, conditioning, and marketing. The authors have dealt with the foci of contamination, washing of the fruits, disinfection of containers used for transport, disinfection of the walls and floor of the store-room, disinfection of the conditioning line, and the cleaning and disinfecting agents that may be used. In conclusion, a set of recommendations have been formulated. KMD

ORANGE

894 PRAGER (MJ) and MISKIEWICZ (MA). Gas chromatographic-mass spectrometric analysis, identification, and detection of adulteration of perfumery products from bitter orange trees. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 131-8

A gas chromatographic procedure was developed for identifying and detecting adulteration of several perfumery products from the bitter orange tree. Components present to the extent of about 1% or more were determined quantitatively in reference and commercial samples of petitgrain oil, petitgrain absolute from water, neroli oil, orange flower absolute water and orange flower absolute. About 20 major components were common to these materials. These compounds were identified by mass spectrometric analysis following chromatographic separation and included β-pinene, limonene, γ-terpinene, linalool

γ-terpinene, linalool oxide, linalool, linalylacetate, α-terpineol, neryl acetate, geranyl acetate, nerol, geraniol, phenethyl alcohol, benzyl cyanide, nerolidol, methyl anthranilate, farnesol, and indole. AA

GRAPEFRUIT

895 ROMOJARO (F), BANET (E) and LLORENTE (S). Carotenoids in both flavedo and pulp of marsh seedless grapefruit. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 385-92 (Spanish)

A comparative study of several separation procedures of carotenoids from both flavedo and pulp of marsh seedless grapefruit is carried out, and the combination of column chromatography, using magnesium oxide-Hyflo Super Cel (1:1) and alumina (activity grade II-III), and thin layer chromatography with Silicagel 60, is proposed as the most suitable method. In both fruit fractions the colourless carotenoids, phytoene and phytofluene are more abundant: the coloured fraction amounts to 32% in flavedo and only 19% in pulp. AA

ORANGE

896 ALBEROLA (J) and IZQUIERDO (L). The volatile fraction of orange juice. II. Headspace analysis. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 327-37 (Spanish)

Techniques used for analysis of the volatile fraction contained in the air of the free space above the food in a vessel (headspace analysis) are reviewed. These analysis can be carried out either directly, by injecting a measured volume of air from the above mentioned free space in the gas chromatograph, or after concentrating the volatile fraction, either by cryogenic trapping, or by adsorption on porous organic polymers. Special attention is paid to the application of these techniques to the analysis of the volatile fraction of orange juice. AA

897 Van GESTEL (J) and Van REEMPTS (J). Scanning electron microscopy of *Penicillium italicum* on oranges treated with R-23979, a derivative of imidazol. *Fruits.* 35(3); 1980; 165-70 (French)

Macroscopic observation and scanning electron microscopy of fruit rot, of mycelial growth, and of spore formation have been employed to evaluate the efficacy of the fungicide 1(2-(2,4-dichlorophenyl)-2(2-propenyloxy)ethyl)-1H-imidazole (R-23979) on oranges artificially infected by *Penicillium italicum*. The fungus did not develop during the observation period (6 days) on fruits that had been dipped in a 0.01% solution of R-23979-sulphate, one day before inoculation. A distinct reduction in fungal infection and absence of formation of conidia were observed in fruits treated 3 days after infection. Deformation of hyphae and absence of conidial development were revealed by scanning electron microscopy. KMD

CHERRY

898 OKOMBI (G), BILLOT (J) and HARTMANN (C). Carotenoids of the cherry (*Prunus avium*, cv. Bigarrean Napoleon)- Evolution during growth and maturation. *Fruits.* 35(5); 1980; 313-20 (French)

Qualitative and quantitative variations of cherry (*Prunus avium*) carotenoids have been studied during growth and maturation. While the green fruit has a carotenoid composition resembling that of the leaves, some new xantho-

phylls (zeaxanthines....) appear during maturation. Two periods in fruit development are distinguished between the 5th and the 11th week after full flowering: (1) the first period, ending 8 weeks after flowering, showing a decrease in β-carotene and xanthophylls; (2) the second period, showing an increase in β-carotene, corresponding to the phase of maturation. KMD

SOURSOP

899 AWAN (JA), KAR (A) and UDOUDOH (PJ). Preliminary studies on the seeds of *Annona muricata* Linn. *Qualitas Plantarum.* 30(2); 1980; 163-8

Soursop (*Annona muricata* Linn) seeds were analysed for proximate composition and were found to contain 22.10% pale yellow oil and 21.43% protein. The seed kernel oil is bland in taste and possesses an acid value of 0.93, a saponification value of 227.48, an iodine value of 111.07 and an acetyl value of 66.77. The oil consists of 28.07% saturated and 71.93% unsaturated fatty acids. Further studies, especially on processing to remove the toxic constituents of the seeds are essential, in order to exploit the oil for culinary purposes. The oil-cake may be a suitable protein supplement for cattle. VR

PASSION FRUIT

900 FOUQUE (A) and FOUQUE (R). Some notes on the yellow passion fruit, *Passiflora edulis* SIMS, variety *flavicarpa*. *Fruits*. 35(5); 1980; 309-12 (French)

SUGAR, STARCH AND CONFECTIONERY

901 KOCH (HJ) and SEETGE (H). Possibilities of decreasing the consumption of thermal energy for the sterilization and distillation of molasses in yeast factories and distilleries. Part II. *Lebensmittel-Industrie*. 27(5); 1980; 207-9 (German)

The fundamentals of energy saving during distillation are discussed in this part. Ways of rationalizing the existing plants and processes for baker's yeast and raw spirit production have been dealt with. A comprehensive application of these proposals will ensure a great saving in energy. The expenditure can be recovered in less than two years. KMD

902 INGLETT (GE). Sweeteners: A Review. *Food Technol.* 35(3); 1981; 37-41

The review covers natural sweeteners like sucrose, corn sweeteners and high fructose corn syrups; intense sweeteners of natural origin comprising of phyllodulcin stevioside, glycyrrhizin, Lo han fruit and osladin; protein sweeteners like miracle fruit, serendipity berries and kutemfe and synthetic sweeteners including peptide based sweeteners, dihydrochalcone sweeteners, acesulfame-K and some other synthetic sweeteners. KAR

903 KOCHAN (A). Further development of the complex quality assurance by demand analysis, explained by the example of the chocolate industry. *Lebensmittel-Industrie*. 27(5); 1980; 215-8 (German)

BAKERY PRODUCTS

904 KILBORN (RH) and PRESTON (KR). A dough height tracker and its potential application to the study of dough characteristics. *Cereal Chem.* 58(3); 1981; 198-201

The instrument consists of a light weight.low friction piston which is placed on the dough surface. The movement of the piston is converted into an electrical signal proportional to the dough height. The instrument is useful from small scale to medium scale doughs (300 g or less) and is able to measure height upto 110 mm. BSN

905 TSEN (CC) and WEBER (J). Dough properties and proof times of yeasted doughs affected by surfactants. *Cereal Chem.* 58(3); 1981; 180-1

906 BELL (BM), DANIELS (DGH) and FISHER (N). Vacuum expansion of mechanically developed doughs at proof temperature: Effect of shortening. *Cereal Chem.* 58(3); 1981; 182-6

BREAD

907 POMERANZ (Y). Wrap-up of symposium on theory and application of lipid-related materials in breadmaking: Today and tomorrow (Not yesterday). *Cereal Chem.* 58(3); 1981; 190-3

908 BOHNENBLUST (JP). Industrial production of "baguettes" (i.e. French bread). *Getreide Mehl Brot.* 34(4); 1980; 104-6 (German)

The most important points to be remembered if one wants to obtain French bread of best quality are: good flour quality; smooth dough flow; adequate fermentation; improved dough; prolonged raising; careful cutting; and ensuring natural cooling after baking. VR

909 RABE (E). Organic acids in bread with different rye content: Part 1. Methods for determining the type of acidification. *Getreide Mehl Brot.* 34(4); 1980; 90-4 (German)

A method is reported for determination of acidity of breads containing rye or wheat in different proportions. The evaluation is done on the basis of the relationship of formed acid to be used acid or of the contribution of the used or added acids on the degree of acidity. The results obtained in the case of rye, mixed rye, and mixed wheat breads, wherein citric acid was used as main component of acidification, are given. Addition of caraway does not alter quality of the end product; however, addition of soyaflour affects the quality, since larger quantities of citrate are introduced into the bread. VR

910 TANGKONGCHITR (U), SEIB (PA) and HOSENEY (RC). Phytic acid. I. Determination of three forms of phosphorus in flour, dough and bread. *Cereal Chem.* 58(3); 1981; 226-8

The analytical scheme is intended for estimating phytate phosphorus, inorganic phosphorus and phosphorus not precipitated by ferric ion in flour, dough and bread. By calculation of mass balance, for phosphorus, the determinations could be made. Spiking experiments have shown that the scheme is reliable. BSN

911 TANGKONGCHITR (U), SEIB (PA) and HOSENEY (RC). Phytic acid. II. Its fate during breadmaking. *Cereal Chem.* 58(3); 1981; 229-34

The analytical scheme developed to measure phytate phosphorus, inorganic phosphorus, and phosphorus not precipitated by ferric ions was used to follow the loss of phytate during breadmaking. In whole wheat pup loaves, the cumulative loss of phytate phosphorus after fermentation, proofing, and baking was ~16, 19 and 22%, respectively. The phytate phosphorus loss was almost totally accounted for by an increase in inorganic phosphorus. Phytate phosphorus in seven commercial whole grain breads ranged from 218 to 808 mg per pound loaf "as is," whereas that in white bread ranged from 83 to 173 mg per pound. The principal barrier to destruction of phytate in breadmaking appears to be the insolubility of magnesium phytate in dough. AA

912 FAUBION (JM) and HOSENEY (RC). Lipoxygenase: Its biochemistry and role in breadmaking. *Cereal Chem.* 58(3); 1981; 175-80

Discusses: sources; isolation and purification; reaction mechanism; specificity of product produced; co-oxidation; mixing tolerance in bread making; lipid binding; and changes in dough rheology. BSN

913 CHUNG (H), SEIB (PA), FINNEY (KF) and MAGOFFIN (CD). Sucrose monoesters and diesters in breadmaking. *Cereal Chem.* 58(3); 1981; 164-70

914 KROG (N). Theoretical aspects of surfactants in relation to their use in breadmaking. *Cereal Chem.* 58(3); 1981; 158-64

Discusses: Chemical structure; surface activity; formation of lyotropic mesomorphic phases; surfactants and dough conditioners; and surfactants as crumb softeners. BSN

915 CHUNG (OK), TSEN (CC) and ROBINSON (RJ). Functional properties of surfactants in breadmaking. III. Effects of surfactants and soy flour on lipid binding in breads. *Cereal Chem.* 58(3); 1981; 220-26

916 D'APPOLONIA (BL) and MORAD (MM). Bread staling. *Cereal Chem.* 58(3); 1981; 186-90

Discusses: role of starch retrogradation; proteins; pentosans; water; and lipids. BSN

917 OSBORNE (BG). The occurrence of ochratoxin A in mouldy bread and flour. *Food Cosmet. Toxicol.* 18(6); 1980; 615-7

Fifty samples of mouldy bread and seven samples of mouldy flour lumps were analysed for mycotoxins by thin layer chromatography (TLC). Ochratoxin A was detected in one sample of bread at a level of 0.21 mg/kg and in two of the samples of mouldy flour lumps at levels of 2.9 and 0.49 mg/kg, respectively. The presence of ochratoxin A was confirmed by high performance liquid chromatography (HPLC). Citrinin was also detected in one of these samples of mouldy flour lumps, but was present at levels too low to be quantitated. TLC indicated the presence of patulin in two of the samples of bread; but subsequent HPLC did not confirm this finding. AA

COOKIE

918 CLEMENTS (RL) and DONELSON (JR). Functionality of specific flour lipids in cookies. *Cereal Chem.* 58(3); 1981; 204-6

919 CONNER (MA) and KEAGY (PM). Folacin retention and cookie diameter in enriched cookies: Regression analysis using factorial design. *Cereal Chem.* 58(3); 1981; 239-44

Folacin retention in cookies baked from flour fortified to National Research Council recommendations (0.07 mg of folic acid per 100 g of flour) is predicted by a least squares regression equation using baking time (7.6-12.7 minute), baking temperature (334-432 F), unneutralized soda squared (0.3-35 mmol/100 g of flour), and thickness (5.0-10.5 mm) as the independent variables. The proportion of leavening gas from ammonium bicarbonate (50-90%) and the rest time of the dough had no measurable effect. An average of 85% of the dough folate was retained by the control cookies (time, 9.8 minute; temperature, 385 F, excess soda, 3.3 mmol, and thickness, 7.0 mm). Folacin retention may also be predicted by cookie colour or cookie pH and soda level. Regression equations for product diameter indicate that at an initial dough thickness of 9.5 mm, diameter can be predicted by time x temperature, soda x temperature, and soda. The presence of the time-temperature interaction enables themodel to describe samples that are removed from the oven during the initial spreading phase before the dough has set or later when the cookies are drying and shrinking. AA

MILK AND DAIRY PRODUCTS

920 ANON. Speed control on dairy machinery. *Ind. Aliment.* 19(169); 1980; 117-20 (Italian)

921 TOBA (T), TOMITA (Y), ITOH (T) and ADACHI (S). β-Galactosidases of lactic acid bacteria: Characterization of oligosaccharides formed during hydrolysis of lactose. *J. Dairy Sci.* 64(2); 1981; 185-92

922 CHANDER (H), BATISH (VK), GHODEKAR (DR) and SRINIVASAN (RA). Factors affecting lipase production in *Rhizopus nigricans*. *J. Dairy Sci.* 64(2); 1981; 193-6

MILK

923 ARMITAGE (GW). A mini H.T.S.T. milk pasteurising plant. *Environ. Health.* 89(4); 1981; 94-5

The Mallinson Read HTST continuous Flow Pasteurizer for pasteurizing 200 gallons per hour of raw milk has been described and its operational details together with the problem of cleaning and tests for efficiency of heat treatment of milk indicated. BSN

924 PENNINGTON (JA), SPAHR (SL) and LODGE (JR). Influences on progesterone concentration in bovine milk. *J. Dairy Sci.* 64(2); 1981; 259-66

925 FRIEDENTHANL (M), SIIMER (E) and KOSTNER (A). Rennet action on skim milk. *J. Dairy Sci.* 64(2); 1981; 342-5

Action of rennet on skim milk and on reconstituted dried skim milk at temperatures of 15 to 45 C has been investigated by spectrophotometric measurement of reaction products at 290 nm. Rennet activity can be related to product formation by the equation, $k(E) = 1/T_{.6}$, where E is the enzyme concentration (mg/ml) and $T_{.6}$ is time required to obtain products with an absorbance of .6 to 290 nm. The factor, k, depends on the specific rennet preparation and on

the temperature of the reaction. With this equation to analyze data, concentration and activity of rennet preparations can be determined. AA

926 GUILIANY (BE). Simplified automated system for determination of vitamin A in milk. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 225-6

A simplified automated system for the determination of vitamin A in milk has been developed to eliminate back pressure and cleaning problems previously experienced. A more specific primary optical filter has also been used. AA

927 KAPOOR (SK), CHAWLA (RP) and KALRA (RL). Simplified method for estimation of DDT and hexachlorocyclohexane residues in milk. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 14-5

A procedure that combines acetone-hexane extraction and cleanup by treatment with concentrated sulphuric acid is described for determining DDT and 1,2,3,4,5,6-hexachlorocyclohexane (HCH) residues in milk. Recoveries from samples fortified with 0.004-0.008 ppm of different HCH isomers and 0.01-0.02 ppm DDT and its metabolites ranged from 83.4 to 99.8%. The proposed method is simple and rapid, and does not require the use of costly adsorbent. AA

928 APPUSWAMY (S) and RANGANATHAN (B). Occurrence of clostridia in milk and milk products. *J. Food Sci. Technol. (India)* 18(6); 1981; 258-9

547 samples of milk and milk products procured from various markets and dairies in India were analysed for clostridia Amongst 310 positive samples-the incidence of clostridia was highest in processed cheese (66.4%), followed by infant foods (65.5%), pasteurized milk (59%), raw milk (49.5%) and dried milk (44.4%). The average clostridial spore count in milk and milk products was as follows: raw milk, 1500/100 ml; pasteurised milk, 300/100 ml; processed cheese (bulged cans), 1000/g; processed cheese (normal cans), 500/g; dried milks, 100/g and infant foods, 150/g. KAR

PEDA

929 THOMPKINSON (DK) and SUKUMAR De. Utilization of dried khoa for peda making. *J. Food Sci. Technol. (India)* 18(6); 1981; 259-60

Roller dried buffalo and cow milk khoa powder stored for 120 days were used for peda (a khoa based sweet meat) making. Cow khoa powder was chalky and sticky; addition of chocolate improved the taste. Peda made from buffalo khoa powder had slight khoa like flavour and smooth body. Acceptable quality Peda could be prepared using buffalo khoa powder stored at room temperature for 105 days; but the cow and buffalo khoa powder stored at 37 C had shelf life of 45 and 60 days respectively. KAR

CREAM

930 HALES (D). Microbiological standards for frozen cream. *Environ. Health.* 89(5); 1981; 126-30

WHEY

931 BURGESS (KJ). The whys and wherefores of whey utilisation. *Food Flavour. Ingred. Packag. Process.* 3(3); 1981; 22-3,27,31,41

Discusses: ultrafiltration; ion exchange protein recovery; lactose utilisation; lactose hydrolysis; immobilized enzyme hydrolysis; and fermentation of lactose. BSN

MEAT AND POULTRY

932 ANON. Meat products regulations. *Br. Food J.* 82(897); 1980; 108-11
A review of the Food Standards Committee Report on a whole range of meat products and regulations. AA

933 ALVAREZG (PI), MASSALDI (HA) and MAYMO (JA). Extraction of tallow from meat meals: I. Assays in bench scale. *J. Am. Oil Chem. Soc.* 57(6); 1980; 178-82
A laboratory study on solvent extraction of tallow from meat meals is described for both a stirred batch system and a flooded percolation system. The stirred batch system data, interpreted by standard diffusion concepts, show that the extraction process proceeds through a somewhat complex mechanism, which involves at least two types of extractable fat. The results for the percolation system, which show the effect of different operating variables, indicate good yields are possible with a substantially low solvent requirement. AA

934 SOMLYO (AV), BUTLER (TM), BOND (M) and SOMLYO (AP). Myosin filaments have non-phosphorylated light chains in relaxed smooth muscle. *Nature.* 294(5841); 1981; 567-9

935 FACCINI (G). Laboratory for meat: An example of modern and economic modernization. *Ind. Aliment.* 19(169); 1980; 109-12 (Italian)
The equipment and procedure required to modernise an old meat curing and processing unit have been described. The maximum possible stability of temperature and relative humidity are required in such a plant. Details are given of the assembly, in the Piedmont region (sub-montane zone of southern Italy), of such a production unit which can work throughout the year. KMD

936 HUGHES (L), LEDWARD (DA), MITCHELL (JR) and SUMMERLIN (C). The effect of some meat proteins on the rheological properties of pectate and alginate gels. *J. Texture Stud.* 11(3); 1980; 247-56

937 CANTONI (C), PALEARI BIANCHI (MA) and BERETTA (G). Aeration and oxidation of nitrite in meat products. *Ind. Aliment.* 19(170); 1980; 224-5
Sodium nitrite is transformed into nitrogen dioxide by a current of air. This happens in some meat products (pancetta) when they are dried under forced ventilation. The sodium nitrite is completely transformed, and so, the formation of nitrosopigments, which give meat its red colour, becomes impossible. KMD

938 FRITZ (W) and UHDE (WJ). On the problem of endogenous formation of N-nitroso compounds in the organism. *Ernahrungsforschung.* 25(1); 1980; 17-9 (German)
Experiments on animals involving estimation of nitrosamines in the gastric juice, and formation of tumours, have shown that N-nitroso compounds are formed endogenously in animals, that have been fed with non-cancerogenic precursors. N-nitroso compounds may be formed in human beings also: (a) in traces, by direct nitrosation, in the acidic, healthy stomach; and (b) in the diseased organism, as a result of bacterial activity in the stomach in cases

of anacidic gastrities, or in the infected urinary baldder. Formation of N-nitrosamines can be reduced, or prevented, when, e.g., ascorbic acid is added to the non-cancerogenic precursors. KMD

939 STANLEY (DW), VOISEY (PW) and SWATLAND (HJ). Texture-structure relationships in bacon lean. *J. Texture Stud.* 11(3); 1980; 217-38

940 KONDOS (AC). Human requirements of amino acids and the composition of fresh and processed meats. *Food Nutr. Notes Rev.* 37(3); 1980; 95-102

Discusses: analytical methods; sampling; definition of meat quality; effect of manufacturing on meat protein quality; meat composition; and amino acid requirements. BSN

941 ANALYTICS OF ARTIFICIAL SAUSAGE SUBJECT TO RECOMMENDATION XLIV of the FEDERAL HEALTH OFFICE. *Dtsch. Lebensmittel-Rundschau.* 76(9); 1980; 317-20 (German)

The article deals with: (a) identification of the artificial sausage casings; (b) special investigation of artificial sausage casings from cellulosehydrates and (c) special investigation of artificial sausage casings from tissues coated with protein. VR

942 NORDAL (J) and SLINDE (E). Characteristics of some lactic acid bacteria used as a starter cultures in dry sausage production. *Appl. Environ. Microbiol.* 40(3); 1980; 472-5

943 CANTONI (C) and PIZZO (P). The classification of coagulase negative staphylococci isolated from dry (seasoned) sausages. *Ind. Aliment.* 19(169); 1980; 99-101

One hundred strains of coagulase negative staphylococci were isolated from dry sausages and classified according to the Schleifer-Kloos system (1975). Eleven strains could not be so classified, but four such strains could be classified by the Baird-Parker system (1963). KMD

944 SMITH (JL) and PALUMBO (SA). Inhibition of aerobic and anaerobic growth of *Staphylococcus aureus* in a model sausage system. *J. Food Safety.* 2(4); 1980; 221-33

945 CASERIO (G), PANIZZI (A) and CICERI (E). The behaviour and significance of coagulase positive staphylococci during seasoning of Italian salami. *Ind. Aliment.* 19(169); 1980; 102-8 (Italian)

On the basis of a literature review, the authors conclude that if one starts with meat having little or no *Staphylococcus* contamination, the level of this organism at the end of ripening is decidedly negligible; if the traditional, or usual, or necessary seasoning is done "according to good, industrial practice" there is no risk, not even a remote one, of the occurrence of Staphylococcal enterotoxins, the total exclusion of *Staphylococcus aurei* in ripened salami cannot be guaranteed. One can say that a *Staphylococcus aurei* count of 5000/g is still acceptable, which action to reduce the *staphyloccal* load should be taken only when the count exceeds 10,000/g. KMD

BEEF

946 BUNDY (KT), ZABIK (ME) and GRAY (JI). Edible beef tallow substitution in white layer cakes. *Cereal Chem.* 58(3); 1981; 213-6

947 JOLLEY (PD), HONIKEL (KO) and HAMM (R). Influence of temperature on the rate of post-mortem metabolism and water-holding capacity of bovine neck muscles. *Meat Sci.* 5(2); 1981; 99-107

948 TAYLOR (AA), SHAW (BG) and MacDOUGALL (DB). Hot deboning beef with and without electrical stimulation. *Meat Sci.* 5(2); 1981; 109-23

Two hot deboning procedures for producing vacuum packed primal beef joints were compared with conventional side chilling followed by cold deboning. Cold shortening toughness was avoided in the hot procedures either by a delay before chilling or by electrical stimulation of the carcass. Overall evaporative losses were 0.6% with hot deboning and 1.9% with cold deboning. Hot deboning reduced drip loss but the effect was smaller after electrical stimulation. The colour of large muscles which cool unevenly on the side was more uniform after hot deboning, but again the improvement was smaller after electrical stimulation. There was no difference in bacterial contamination or growth on hot and cold deboned meat, and instrumental and sensory assessments confirmed that eating quality was similar for all three treatments. AA

949 DRANSFIELD (E), JONES (RCD) and MacFIE (HJH). Quantifying changes in tenderness during storage of beef. *Meat Sci.* 5(2); 1981; 131-7

950 PERERA (CO) and ANGLEMIER (AF). Isolation and partial characterisation of bovine rumen myosin. *Meat Sci.* 5(2); 1981; 149-58

951 NOVAKOFSKI (JE) and KAUFFMAN (RG). Fat deposition in a double-muscled steer. *Meat Sci.* 5(2); 1981; 159-63

952 PINEGAR (JA) and ARMSTRONG (R). *Salmonellae* and other organisms in processed elder. *Environ. Health.* 89(5); 1981; 120-3

953 KEMPSTER (AJ). Fat partition and distribution in the carcasses of cattle, sheep and pigs: A review. *Meat Sci.* 5(2); 1981; 83-98

Discusses: MLC jointing and dissection techniques: fat partition; selection of an independent variate in studies on fat partition; fat partition in different breeds of cattle; fat partition in different breeds of sheep and pigs; fat distribution; environmental, genetic and other aspects. BSN

954 DRANSFIELD (E), JONES (RCD) and MacFIE (HJH). Tenderising in M. *longissimus dorsi* of beef, veal, rabbit, lamb and pork. *Meat Sci.* 5(2); 1981; 139-47

The decrease in toughness of M. *longissimus dorsi* with storage time at 1 C was effectively described by an exponential decay equation. The average rate constant for beef, veal and rabbit was 0.17 whilst that for lamb was 0.21 and that for pork, 0.40 days^{-1}. However, the rate constants were not significantly different due to variations both within muscles and between animals. On an average, 50% of the tenderising occurred in 2 days for pork and in 4-2 days for beef, veal and rabbit, and 80% in 4.9 and 9.5 days, respectively. At the completion of tenderising, beef and rabbit were the toughest and pork the most tender, whilst the greatest tenderising occurred in beef and lamb. AA

SHEEP

955 RESTALL (DJ). Blood splash in lambs: A preliminary study using the one-stage prothrombin time test. *Meat Sci.* 5(2); 1981; 125-9

956 GAUR (PK), EL-NAKIB (O) and CHU (FS). Comparison of antibody production against aflatoxin B_1 in goats and rabbits. *Appl. Environ. Microbiol.* 40(3); 1980; 678-80

PORK

957 McKINLEY (GA), FAGERBERG (DJ), QUARLES (CL), GEORGE (BA), WAGNER (DE) and ROLLINS (LD). Incidence of *salmonellae* in fecal samples of production swine and swine at slaughter plants in the United States in 1978. *Appl. Environ. Microbiol.* 40(3); 1980; 562-6

POULTRY

958 OKUBANJO (AO) and BABALOLA (A). Relative evaluation of yield and quality attributes of Nigerian and exotic strains of chicken. *J. Food Sci. Technol. (India)* 18(6); 1981; 243-5

Prejudice against the consumption of broiler meat in Nigeria prevailed due to its poor palatability and extreme tenderness compared to meat from spent hens. Therefore, attempt has been made to evaluate the light indigenous chicken strain with the dual purpose imported strains (Amocathman and hyline strains) raised under the same feeding and management regimes. Parameters studied included relative grade, weight and cut-up parts of the carcass, fleshing and finish, liver colour score, water pick-up, and objective and subjective scores of various traits. Data on these suggest that intensive feeding and managemet tend to reduce the toughness and variable organoleptic attributes generally associated with the rearing of the indigenous strain. KAR

959 PROLL (J). Nutritional-physiological significance of eggs and poultry meat. *Ernahrungsforschung.* 25(1); 1980; 20-4 (German)

Chicken's eggs and poultry meat are foods of very high value, because of their protein content and easy digestibility in the human organs. The consumption of broilers and turkey-meat should be increased in E. Germany, because of their low fat and energy content. The consumption of eggs should not be increased ; because of their high cholesterol content - but should be maintained at the existing high level. KMD

960 WARREN (MF) and HAMILTON (PB). Inhibition of the glycogen phosphorylase system during ochratoxicosis in chickens. *Appl. Environ. Microbiol.* 40(3); 1980; 522-5

961 WARREN (MF) and HAMILTON (PB). Intestinal fragility during ochratoxicosis and aflatoxicosis in broiler chickens. *Appl. Environ. Microbiol.* 40(3); 1980; 641-5

962 JAIN (RS), BANERJEE (AK) and CHAUDHARY (RP). Studies on the association of egg quality traits with reproductive traits in white leghorn. *Indian Vet. J.* 58(2); 1981; 150-3

SEAFOODS

963 GOVINDAN (TK). Packaging in fisheries - some musings. *Perfectpac.* 21(6/7); 1981; 12-5

The author has described the various methods used to pack fresh fish for the internal trade, frozen fishery products; dried fish; and canned fishery products. KMD

964 MUIR (DCG), GRIFT (NP) and SOLOMON (J). Extraction and cleanup of fish, sediment, and water for determination of triaryl phosphates by gas-liquid chromatography. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 79-84

Several techniques were evaluated for extracting triphenyl phosphate (TPP), ^{14}C-labeled TPP, cresyl diphenyl phosphate, and tricresyl phosphate isomers (o-TCP, m-TCP, and p-TCP) from fish and sediment samples. Extracts of fish samples were cleaned up by gel permeation chromatography/alumina column chromatography; sediment extracts received alumina treatment only. Compounds were determined by gas-liquid chromatography (GLC) with nitrogen-phosphorus detection. Methanol/Polytron and hexane/ball mill extraction of fish samples fortified at 0.01, 0.1, and 1.0 µg/g levels gave overall recoveries of the 5 compounds of 89 and 97%, respectively. Methanol recovered more radioactivity (97%) from fish exposed to ^{14}C-TPP in aquaria for 24 hours than did hexane from fish exposed for 16 hours (79%). Refluxing fortified sediment (0.05 and 0.5 µg/g) with methanol-water (9+1) gave significantly higher recoveries (88%) of the 5 triaryl phosphates than did dichloromethane-methanol (1+1) reflux or acetone-hexane (1+1) Soxhlet extraction. Recoveries of TPP and o-, m- and p-TCP from fortified river water (0.5, 5.0, and 50 µg/L) by shaking with dichloromethane ranged from 91 to 118%. Some problems were encountered with interfering GLC peaks at low (µg/g) levels in fish and sediment extracts despite the use of nitrogen-phosphorus specific detectors. AA

CAT FISH

965 MALKHEDE (DD), RAO (BY), BELSARE (DK) and BELSARE (SD). Tissue phospholipid distribution in catfish. *Indian J. Biochem. Biophys.* 18(1); 1981; 78-9

Two representative species of catfish, *Heteropneustes fossilis* and *Clarias batrachus* were studied for the pattern of phospholipid distribution in tissues of brain, liver and muscle. In all tissues, phosphatidylcholine (lecithin) content was highest as compared to other phospholipids, namely, lysolecthin, spingomyelin, phosphatidyl serine and phosphatidyl ethaolamine. Lecithin content was higher in liver, while contents of phosphatidyl ethanolamine and sphingomyelin were same in all the tissues in both the species. In *H. fossilis*, lysolecithin content was same in liver and brain, but significantly high in muscle tissue, while in *C. batrachus* its contents were higher in brain tissue. MVG

MONKFISH

966 LUNDSTROM (RC). Fish species identification by isoelectric focussing: Sarcoplasmic protein polymorphism in monkfish (*Lophius americanus*). *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 32-7

Monkfish (*Lophius americanus*) sarcoplasmic protein patterns were found to be polymorphic with respect to separations using isoelectric focusing. Reproducible protein pattern variations were not detected using cellulose acetate or polyacrylamide gel disc electrophoresis. Monkfish sarcoplasmic proteins separated on pH 3.5-9.5 Ampholine PAG plates or on pH 2.5-9.0 agarose. IEF gels yielded similar patterns showing 3 distinct, reproducible variations. On close examination, the pH 3.5-9.5 Ampholine PAG plate patterns could be further subdivided into 3 additional variations. A high resolution pH 3.5-5.0 agarose IEF gel was able to resolve a total of 10 different monkfish pattern variations in a sample of 24 individuals. A model was proposed suggesting the existence of 16 distinct variations in the monkfish sarcoplasmic protein pattern, based on the various combinations of 4 protein bands. In identifying samples of monkfish meat, it is necessary to compare the unknown pattern with the possible variant patterns to effect a reliable identification. On recommendation by the Associate Referee, the method for fish species identification based on polyacrylamide gel isoelectric focusing, 18.A01-18.A04, has been adopted for official final action with no restrictions as to the species that may be identified. AA

967 LUNDSTROM (RC). Rapid fish species identification by agarose gel isoelectric focussing of sarcoplasmic proteins. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 38-43

A rapid method is described for fish species identification by agarose gel isoelectric focusing (AGIEF). The AGIEF method can be completed in less than 2 hours and gives reproducible species-specific sarcoplasmic protein patterns. Protein patterns are similar using either centrifuged tissue fluid or muscle tissue as the sample. One species, monkfish (*Lophius americanus*), has a polymorphic protein pattern. A predominant pattern was found in 66.7%, of the individuals; 2 variant patterns were equally distributed among the remaining 33.3%. AGIEF offers a more rapid, less expensive alternative to the current AOAC official first action method for fish species identification based on polyacrylamide gel isoelectric focusing. AA

SHRIMP

968 ALBRECHT (WN), WOODHOUSE (CA) and MILLER (JN). Nearshore dredge-spoil dumping and cadmium, copper and zinc levels in a dermestid shrimp. *Bull. Environ. Contam. Toxicol.* 26(2); 1981; 219-23

MOLLUSC

969 GONZALEZ-CARRERO (MI), CARRERO (JG), LOPEZ CAPONT (F) and GARCIA (FM). Flourine content in molluscs and fishes from the estuarv of arosa (Galicia Spain). The limpet (*Patella vulgata*) as a biological indicator. *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 378-84

Fluorine content in both shells and soft parts of various species of molluscs and bones of two species of fish, from different habitats of the estuary of Arosa has been determined by selective electrode potentiometry. The mean and extreme levels of F (ppm) found in soft parts of molluscs were: limpet (*Patella vulgata*), 17.1 (15.0-18.6); mussel (*Mytilus edulis*), 1.1 (0.8-1.8); clam (*Tapes pullastra*), 0.46 (0.36-0.85). In shells, the levels found were: limpet, 92 (87.94); mussel, 19(9.33); clam. 134 (126-142); razor-clam (*Solen* sp.), 33 (30-37); cockles (*Cerestoderma edule*), 32 (20-42). Based on

the remarkable accumulation of F in the soft parts of common limpet and by other reasons, this mollusc is proposed as a biological indicator for the study of sea contamination by fluorides. AA

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

970 MARTIN (GE), BURGGRAFT (JM), DYER (RH) and BUSCEMI (PC). Gas-liquid chromatographic determination of congeners in alcoholic products with confirmation by gas chromatography/mass spectrometry. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 186-90

A procedure is described for the separation and determination of the following compounds which are found as congeners in alcoholic products: acetaldehyde, ethyl acetate, methanol, ethanol, n-propanol, isobutanol, n-butanol, acetic acid, and the amyl alcohols (2-methyl-1-butanol and 3-methyl-1-butanol). These compounds were separated by gas-liquid chromatography (GLC) using 5% Carbowax 20M on Carbopack B as the column packing. The results obtained by using this method were compared with those obtained using the present AOAC methods for these compounds. GLC chromatograms show better resolution by the method presented. AA

COFFEE

971 SHIN (HK) and CROUZET (J). Recovery of coffee aroma during roasting. I. Trapping of emitted gases by condensation and absorption. *Cafe Cacao The.* 25(2); 1981; 127-36 (French)

It was possible to recover 85% of the volatile components (expressed as % of total organic carbon) of the gas emitted by coffee beans roasted on a continuous, fluidized bed apparatus with recycling of the gases. The trapping was done in two steps: (i) with a water condenser to eliminate 70% of the volatile components; and (ii) with a washing tower to recover another 15% of the volatile components. A fluidized-bed unit on a pilot-plant scale is being designed to treat 8-10 kg of coffee semi-continuously, with a recovery of 90%. KMD

972 SHIN (HK) and CROUZET (J). Recovery of coffee aroma during roasting. II. Removal of fats. *Cafe Cacao The.* 25(3); 1981; 191-6 (French)

Using an apparatus consisting of a condenser with water and a washing tower, one can eliminate only 70% of the fats present in the smoke produced during the roasting of coffee. But if an impact trapping device is used after the washing tower, the yield of fats can be increased to 90%, provided the gases attain a speed of 30 m/s. The efficacy of this system is being studied on a pilot-plant scale. Analysis of the trapped products showed that they are derived principally from the waxes of green coffee. KMD

973 VOILLEY (A) and SIMATOS (D). Modeling the solubilization process during coffee brewing. *J. Food Process. Eng.* 3(4); 1981; 185-98

Two different processes may be considered in coffee brewing: (1) solubilization of some compounds from the grind into the water, and (2) filtration of the extract through the grind. The results obtained for the first of them, solubilization, will be reported here. variations in soluble content as a function of time, temperature, and proportion of coffee to water were interpreted in relation to a model based on the general equation of diffusion and assuming the grind to be spherical particles suspended in a homogeneous system. Qualitative variations in the chemical composition of the extract have also been determined by some physico-chemical measurements: optical density, titrable acidity, viscosity, and caffein content. AA

974 AESCHBACHER (HV), CHAPPUIS (C) and WURZNER (HP). Mutagenicity testing of coffee: A study of problems encountered with the Ames *Salmonella* test system. *Food Cosmet. Toxicol.* 18(6); 1980; 605-13

Instant coffee and fresh-brew coffee gave comparable results when tested in the Ames *Salmonella* mutagenicity test system. Several factors of possible relevance to the findings, such as caffeine level, histidine content, autoclaving and pH were investigated, but none significantly influenced the results obtained with the *Salmonella* test system. However, the bactericidal effects and 'mutagenicity' of coffees were closely related and a 'false-positive; effect due to bactericidal interaction cannot be totally excluded. AA

WINE

975 PEREZ (JL), FARRE (R) and PUJOL (M). Determination of lead in wines, musts and grape juices from Rioja (Spain). *Rev. Agroquim. Tecnol. Aliment.* 19(3); 1979; 417-22 (Spanish)

The lead content of 60 wine samples and 21 must and grape juice samples from Rioja (Spain), has been determined by formation of the Pb-pirrolidinditiocarbamate complex,extraction with methylisobuthylketone and AAS. The method has been previously verified. Only one sample of wine, with 0.31 ppm Pb, exceeds the maximum tolerance level established by FAC/WHO (0.30 ppm); the other 80 samples range from 0.01 to 0.12 ppm and are clearly below the maximum established. AA

BEER

976 PIENDL (A). Beer as food. *Brew. Dig.* 56(1); 1981; 32-6,45

Discusses: production and consumption in Venezuela ; food values (water and caloric content, carbohydrates, proteins and amino acids, minerals, vitamins); organic acids; phenolic compounds; bitter substances; carbon dioxide; sulphur containing substances; nucleic acid components; amines and fatty acids; and ethanol and its cogeners. BSN

WHISKY

977 BYRNE (KJ), REAZIN (GH) and ANDREASON (AA). High pressure liquid chromatographic determination of β-sitosterol and β-sitosterol-D-glycoside in whisky. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 181-5

A high pressure liquid chromatographic method is presented for determining the oak wood steroids, β-sitosterol and β-sitosterol-D-glucoside, which contribute to floc formation in whisky. The steroids are extracted

from whisky by using an adsorbent resin, Amberlite XAD-2, and are detected at 210 nm, or are derivatized to 2,5-dinitrobenzoate esters which are detectable over a wide ultraviolet wavelength range. Detection limits were less than 0.1 ppm for β-sitosterol and less than 0.2 ppm for β-sitosterol-D-glycoside in most whiskies, using the extraction procedure described. When the steroids, were derivatized the detection limits were decreased by about a factor of 10. AA

OILS AND FATS

978 SWAMINATHAN (MS). Augmenting the resources of oils and fats. *Indian Chem. J.* 15(9); 1981; 35-8

After surveying, the availability of edible oils and fats in India during 1964-75, the author has indicated the steps taken to increase oilseed production, and the provisional VIth plan (1979-84) targets for oilseed production. (Continued in Indian Chem. J. 15(10); 1981; 38-46).

979 SWAMINATHAN (MS). Augmenting the resources of oils and fats. *Indian Chem. J.* 15(10); 1981; 38-46

The author has discussed steps that are needed to increase the production of coconuts, and to increase the utilization of cottonseed oil, rice bran oil, of oils obtained from the seeds of various trees, and fish oils. Steps to improve and modify the processing of oilseeds and oils, so as to make more edible oil available for human consumption, have also been indicated. KMD

980 DROSTE (PD). Fat technology and energy economy. *Fette Seifen Anstrichm.* 82(6); 1980; 225-7 (German)

The technological possibilities to save energy during various steps of fat processing are discussed with examples of a power plant and a plant for rendering animal fats. Among the various processes for fat refining, those involving alkali refining, distillative deacidification, deodorization and fatty acid distillation, hydrogenation, fat splitting and glycerine recovery are discussed. AA

981 PFANNHAUSER (W), SCHEIDL (I) and WOIDICH (H). Examination on the pesticide content of nutritional fats and oils. *Fette Seifen Anstrichm.* 82(6); 1980; 232-6

Chlorinated hydrocarbons are due to their lipophilic properties accumulated in fat containing food. Traces of chlorinated compounds, used as pesticides or of PCBs, which are similar in structure, have been found in trace amounts in all kinds of fat of animal as well as vegetable origin. Raffination process decontaminates oils and fats to a great extent. Oil and fat of animal origin contains more chlorinated pesticides than that of vegetable origin. Oil made from pumpkin kernels, which is produced in Syria/Austria and will not be refined contains somewhat higher traces of chlorinated compounds. Aldrin and dieldrin content on basis of kernels is in some cases higher than tolerated by legislation in Austria. AA

982 NASIRULLAH, SIDDIQI (SF), AHMAD (F), ANSARI (A) and OSMAN (SM). Studies on herbaceous seed oils XI. *Fette Seifen Anstrichm.* 82(6); 1980; 241-3

Seeds from eight species were analysed by standard procedures for oil and protein contents. The fatty acid composition of the oils was determined by GLC. Five species were found to contain oils above 20%, However, none of them is rich in protein. Some of the oils have a composition fairly similar

to the oils at present in common use. Five seed oils are interesting in having more than 50% of saturated acids of the total fatty acids. *Tragia involucrata* seed seems to be a promising species because of its high oil and linoleic acid (61.7%) contents. AA

983 ATHANASSIADIS (A). Considerations on energy saving in vegetable oil refining. *Fette Seifen Anstrichm.* 82(6); 1980; 219-24
Certain energy saving techniques in the processing and refining of vegetable oil have been mentioned. These measures have enabled the author to reduce by half the steam and fuel consumption in an existing refining plant. VR

984 LAWRENCE (BM). Progress in essential oils. *Perfum. Flavor.* 6(1); 1981; 37-46
Discusses: Armoise oil; asafoetida oil; dill oil; horseradish oil; and tejpat oil. BSN

985 DENNY (EFK). Parameter test distillations for the superficial essential oils. *Perfum. Flavor.* 6(1); 1981; 47-53

986 MORRIS (ET). Roots: The earliest history of the essential oil industry. *Perfum. Flavor.* 6(1): 1981; 54-8

987 TRENCH (B). Spains toxic oil: The death-toll mounts. *New Sci.* 92(1281); 1981; 604-6.

988 ANON. Fat-visible and invisible. *Br. Food J.* 82(897); 1980; 112-3
A review with special reference to the quality and quantity consumed in Western types of diet and in various regional dietaries in the East. AA

989 KNIGHTLY (WH). Shortening systems: Fats, oils and surface-active agents - present and future. *Cereal Chem.* 58(3); 1981; 171-4
Discusses: historical background; production and composition of shortening; shortening emulsifiers; surface active dough conditioners; surfactants and oils; and shortening systems of the future. BSN

990 SZYMANOWSKI (J), MIESIAC (I) and JERZYKIEWICZ (W). Synthesis and properties of esterification products of some oxyethylated alcohols and alkylphenol with fatty acids. *Fette Seifen Anstrichm.* 82(6); 1980; 244-9
Some esterification products were prepared from oxyethylated alcohols and alkylphenols using stearic and oleic acids. The functional properties of the products were estimated. It was found that they displayed good emulsifying and dispersing ability and did not exhibit any foaming power at all. In all alkaline medium, they also show a washing power due to a gradually proceeding hydrolysis. AA

SPICES AND CONDIMENTS

ONION

991 BAJAJ (KL), KAUR (G), JARNAIL SINGH and GILL (SPS). Chemical evaluation of some important varieties of onion.(*Allium cepa* L.). *Qualitas Plantarum.* 30(2); 1980; 117-22

Five white and seven red varieties of onion were analysed for dry matter, carbohydrates, total phenols, colouring matter, lachrymatory factor and pyruvic acid content. Percent dry matter varied from 10.66 to 14.80. Total water soluble sugars, reducing sugars and total phenols ranged from 41.50 to 74.00, 12.00 to 22.25, and 1.75 to 2.95 per cent (on a dry weight basis), respectively. The lachrymatory factor and pyruvic acid content ranged from 8.00 to 27.25 mg/100g and 6.18 to 13.27 micromoles/g respectively on a fresh weight basis. Red varieties contained a higher phenolic content than white ones. Varieties with higher phenolic content also had a greater amount of colouring matter in the dehydrated onions. The variety Punjab-48 was considered to be most suitable for dehydration purposes. AA

GARLIC

992 KAMANNA (VS) and CHANDRASEKHARA (N). Fatty acid composition of garlic (*Allium sativum* Linnaeus) lipids. *J. Am. Oil Chem. Soc.* 57(6); 1980; 175-6

Chloroform-methanol extracted lipids of garlic (*Allium sativum* Linnaeus) amounted to 0.6% on a dry weight basis. Fractionation by silicic acid column chromatography showed that garlic lipids comprise 62.6% neutral lipids 14.0% glycolipids and 23.4% phospholipids. Fatty acid compositions of total lipids and component lipids fractions were determined. AA

SAFFRON

993 LEWIS (YS), SAMPATHU (SR), SHIVASHANKAR (S) and NATARAJAN (CP). Quality evaluation of saffron. *Indian Cocoa Arec. Spice J.* 4(4); 1981; 113-5

Quality parameters of saffron may be determined by physical, chemical and organoleptic tests. Based on a study of several samples of saffron, the characteristic physical properties for assessing quality have been reported as: dark red colour; thread like filaments (1-2 cm long) spreading like a trumpet at one end; strong and aromatic, slightly iodinated odour; bitter and slightly pungent taste; colour diffusion in water, when placed on surface of warm water, the stigma expanding immediately and colour diffusing slowly; and floral waste, 15% (maximum). The chemical parameters are: moisture and volatile (103 C), 14% (maximum) by weight total ash, 8% (maximum), by weight ash insoluble in hydrochloric acid, 1.5% (maximum) by weight aqueous extract, 55-65%; total N, 1.5-3.0%, colouring power E_1 1% cm at 440 nm, minimum 100; TLC using 80% ethanol for extraction and butanol acetic acid; water (4:1:1) as solvent for elution, three intense characteristic spots, reaction with 0.5% solution of diphenyl amine in sulphuric acid and deep blue colour turning brownish red. BSN

GINGER

994 SMITH (RM) and ROBINSON (JM). The essential oil of ginger from Fiji. *Phytochemistry.* 20(2); 1981; 203-6

The essential oil of ginger (*Zingiber officinale*) from Fiji was analysed by GC-MS and a number of sesquiterpenes not reported previously in ginger oil were identified including α-copaene, β-bourbonene, α-bergamotene, α-selinene, calamenene and cuparene. The composition of the oil was unusual in having a much higher neral and geranial content than oils reported from India, Australia, Japan and Africa. AA

SENSORY EVALUATION

995 VICKERS (ZM) and CHRISTENSEN (CM). Relationships between sensory crispness and other sensory and instrumental parameters. *J. Texture Stud.* 11(3); 1980; 291-307

Twenty subjects judged the crispness, loudness, and firmness of sixteen food samples by both biting and chewing and by only biting the foods. These subjects also scored the foods for thirteen textural qualities. Instrumental measures of slope, peak force, and deformation to fracture were obtained for the sixteen foods from a snap test at four deformation rates. Whether a subject judged an attribute by the bite or the bite and chew technique made little or no difference in the sensory judgments. Crispness appeared to be very closely related to loudness and less closely related to firmness. Loudness of the chewing sounds was more closely related to crispness than to firmness. Of the sensory qualities studied, loud, snap, and crackly were the three most closely related to crispness. Of the instrumental parameters Young's Young's Modulus generally had the highest correlation with the crispness of all foods and peak force generally had the highest correlation with firmness. Deformation rate had minimal effects on measures of flexure or peak force, but its effects on Young's Modulus were frequently large and irregular. A vibrotactile acoustical hypothesis for crispness is proposed. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

996 RAJENDRAN (S) and MUTHU (M). Sorption affinity of various stored products towards acrylonitrile. *J. Food Sci. Technol. (India)* 18(6); 1981; 234-6

Acrylonitrile (AN) was applied at the rate of 100 mg/1 at 25-30 C to cereals, pulses and their products, oilseeds and cakes, spices, dry fruits, nuts, instant foods and infant foods and the AN sorbed in 24 hours was determined. Sorption was very high (~400 ppm) for paddy, wheat flour, cowpea, some split pulses, sesame, sunflower, coriander, cumin and papad; moderate (200-300 ppm) for raisin, dry dates, figs, instant food beverages, maize, horse gram, pigeon pea, tamarind pulp and brown sugar and least for (<200 ppm) for refined sugar, glucose and some instant beverages. KAR

997 NOWICKI (HG). Application of azulene as visual aid to monitor column chromatographic fractionation of samples for pesticide and polychlorinated biphenyl determination. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 16-8

Environmental samples are cleaned up by Florisil column chromatography, using azulene as a visual aid to monitor column performance. Azulene migrates as a blue band in the 6% ethyl ether, hexane fraction, and the gas chromatograph electron capture detector (GC-ECD) is nonresponsive at the use concentration. This method complements the standardization of Florisil columns by weight adjustment based on adsorption of lauric acid. Spiking of sample with azulene provides a convenient real-time monitor for column channeling, mistakes in polarity of mobile phases, particular sample composition,

column overloading, and dynamic changes in the adsorptivity of the stationary phase between lauric acid calibration and use. Using this visual aid, the analyst is alerted to unexpected column behaviours. Normally, polychlorinated biphenyls (PCBs) elute in the 6% fraction, in front of the blue indicator. Experiences with azulene and industrial effluent samples demonstrated that PCBs can elute in the 100% hexane fraction. GC-ECD analysis of the hexane eluate revealed a PCB characteristic chromatogram, not observed with the original extract. Thus, monitoring column performance avoided reporting a flase negative result, i.e., no PCBs in the 6% ethyl ether-hexane fraction. AA

998 BYRNE (JJ) and PEPE (MG). A protein binding radio-assay method for measuring PCB (Hexachlorobiphenyl) incorporation in culture cells. *Bull. Environ. Contam. Toxicol.* 26(2); 1981; 237-42

999 RASERO (FS). Atomic absorption spectrophotometric method for determination of water-soluble copper in water-insoluble copper fungicides: CIPAC collaborative study. Comparison with bathocuproine method. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 75-8

1000 KVENBERG (JE). Comparison of larval stored product beetle mandibles by light microscope and scanning electron microscope. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 199-224

Larval stored product beetle mandibles were studied by comparing images made by scanning electron microscopy with those made by conventional light microscopy. Discussion of morphological characteristics is based on illustrations of 25 species. AA

BIOCHEMISTRY AND NUTRITION

1001 THRASHER (JJ) and GECAN (JS). Chemical test for mammalian feces: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 196-8

1002 WISE (A) and GILBURT (DJ). The variability of dietary fibre in laboratory animal diets and its relevance to the control of experimental conditions. *Food Cosmet. Toxicol.* 18(6); 1980; 643-8

The importance of dietary fibre in laboratory animal nutrition lies in its capacity to influence experimental results, especially the toxicological studies. Thirty five diets for mice, rats, guinea-pigs, rabbits, primates, dogs and cats have been analysed for dietary fibre constituents, namely pectin, hemicellulose, cellulose and lignin. Both the total fibre content of the diets and the proportions of its constituents are very variable and are related to the formula of the diet. AA

1003 ANTONOV (YA), GRINBERG (VYA), ZHURAVSKAYA (NA) and TOLSTOGUZOV (VB). Liquid two-phase water-protein-polysaccharide systems and their processing into textured protein products. *J. Texture Stud.* 11(3); 1980; 199-215

Conditions for the formation of liquid two-phase water - protein - polysaccharide systems containing the main classes of proteins, as defined by Osborne, and various acid and neutral polysaccharides have been determined. Phase diagram of some of these systems have been obtained. It is shown that, proceeding from liquid two-phase water - protein - polysaccharide systems, one can obtain different protein products without using spinnerets. AA

1004 SHIVANANDAPPA (T) and KRISHNAKUMARI (MK). Histochemical and biochemical changes in rats fed dietary benzene hexachloride. *Indian J. Exp. Biol.* 19(12); 1981; 1163-8

Histological, histochemical, and biochemical changes were studied in 6 groups of 28 day-old, weanling, male, albino rats fed technical BHC at 0, 100, 250, 750, 1500 and 3000 ppm levels for 90 days. No significant changes were observed in rats fed 100 ppm of BHC. Serum total cholesterol showed a dose-dependent increase, and total protein also increased marginally. There was no significant increase in the contents of liver DNA, RNA, protein, lipid and cholesterol per unit liver weight. KMD

1005 HEWETT (A), SCOWN (H), WATKINSON (D) and SMITH (B). The 'five food groups' in nutrition education. *Food Nutr. Notes Rev.* 37(2); 1980; 56-7

1006 MULDER (FJ), DeVRIES (EJ) and BORSJE (B). Analysis of fat-soluble vitamins. XXIV. High performance liquid chromatographic determination of vitamin D in vitamin D resin containing powders. Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 58-60

1007 GRUTTE (FK). Intestinal micro-ecology. Known facts and problems. *Ernahrungsforschung.* 25(1); 1980; 1-5 (German)

The author has outlined the principal interactions between the host man and the 10^{14} microorganisms (mostly unicellular) that are settled in his gut. He has pointed out how modern research techniques can help in providing information that could not be obtained up to the present. The effect of nutrition on the microflora in the infant's gut have been discussed briefly; in adults; nutrition has only a limited direct effect on the intestinal microflora. KMD

1008 HITCHCOCK (NE) and GRACEY (M). Diet and nutrient intakes related to socio-economic status: A study of two groups of Western Australian school children. *Food Nutr. Notes Rev.* 37(3); 1980; 115-21

1009 SCHMOZ (G), BAUMANN (J), HARTIG (W), MATTIG (H), MATKOWITZ (R), WEINER (R) and WEISS (C). Experiences with the synthetic balanced diet "BERLAMIN". *Ernahrungsforschung.* 25(1); 1980; 6-11 (German)

BERLAMIN has the following formulation: aminoacids 50 g (casein hydrolysate supplemented with essential aminoacids; minerals and trace elements 15.5g; mono- and disaccharides 533 g (as an aqueous solution of glucose, fructose, and sucrose). It has a volume of 2200 ml and a calorific value of 2200 kcal (9200 kJ). BERLAMIN clears out the intestines completely, and provides optimal nutrition at the same time. Hence, it is of great value in the pre-operative treatment in cases of colonic surgery. It also reduces post-operative complications and the frequency of wound infection. Its value has been proved in the treatment of 108 patients. It can be used even for the treatment of gastro-intestinal fistulae. A therapeutic scheme, based on the use of BERLAMIN, has been worked out using information obtained from the authors' own work and from the literature. As a rule, BERLAMIN is not used for diabetics. KMD

TOXICOLOGY AND HYGIENE

1010 GUPTA (BR), VERMA (JC) and UPPAL (PK). Occurrence of *Salmonella* serotypes in animals in India-I. *Indian Vet. J.* 58(2); 1981; 87-90

330 *Salmonella* cultures of animal origin in India have been grouped into 21 serotypes. BSN

1011 SLY (T). The "Ames Test". The *Salmonella* /Mammalian-microsome test to determine chemical mutagens. *Environ. Health.* 89(5); 1981; 116-9

Discusses: origin; test method (standard plate assay, spot test, testing of volatile liquids and gases); realiability of the test applications for investigation of aflatoxins, methylene chloride, nitrosamines, drinking water, beef extract; and somatic mutation theory and problems involved. BSN

1012 STICH (HF), STICH (W), ROSIN (MP) and POWRIE (WD). Mutagenic activity of pyrazine derivatives: A comparative study with *Salmonella typhimurium*, *Saccharomyces cerevisiae* and Chinese hamster ovary cells. *Food Cosmet. Toxicol.* 18(6); 1980; 581-4

All the test compounds induced chromosome breaks and exchanges. However, the range of pyrazine concentrations which produced a positive result was relatively narrow. The standard 59 activation mixture did not alter significantly the chromosome breaking capacity of the pyrazines. These results indicate the need to use several assays and organisms when testing chemicals for the presence of mutagenic activity. VR

1013 STERN (NJ), KOTULA (AW) and PIERSON (MD). Virulence prediction of *Yersinia enterocolitica* by pyrolysis gas liquid chromatography. *Appl. Environ. Microbiol.* 40(3); 1980; 646-51

1014 HACKNEY (CR), KLEEMAN (EG), RAY (B) and SPECK (ML). Adherence as a method for differentiating virulent and avirulent strains of *Vibrio parahaemolyticus*. *Appl. Environ. Microbiol.* 40(3); 1980; 652-8

1015 FIRSTENBERG-EDEN (R), ROWLEY (DB) and SHATTUCK (GE). Factors affecting inactivation of *Moraxella-Acinetobacter* cells in an irradiation process. *Appl. Environ. Microbiol.* 40(3); 1980; 480-5

1016 SANDERS (ME) and KLAENHAMMER (TR). Restriction and modification in group N streptococci: Effect of heat on development of modified lytic bacteriophage. *Appl. Environ. Microbiol.* 40(3); 1980; 500-6

1017 FOX (DL). Custard slices and *Bacillus cereus*. *Environ. Health.* 89(5); 1981; 125

1018 ALDERTON (G), CHEN (JK) and ITO (KA). Heat resistance of the chemical resistance forms of *Clostridium botulinum* 62A Spores over the water activity range 0 to 0.9. *Appl. Environ. Microbiol.* 40(3); 1980; 511-5

1019 GRAU (FH). Inhibition of the anaerobic growth of *Brochothrix thermosphacta* by lactic acid. *Appl. Environ. Microbiol.* 40(3); 1980; 433-6

1020 DORNER (JW), COLE (RJ), HILL (R), WICKLOW (D) and COX (RH). *Penicillium rubrum* and *Penicillium biforme*, new sources of rugulovasines A and B. *Appl. Environ. Microbiol.* 40(3); 1980; 685-7

1021 PHILLIPS (TD), IVIE (GW), HEIDELBAUCH (ND), KUBENA (LF), CYSEWSKI (SJ), HAYES (AW) and WITZEL (DA). Confirmation of penicillic acid by high pressure liquid and gas-liquid chromatography. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 162-5

A pyrazoline (Py) derivative of the mycotoxin penicillic acid (PA), resulting from its reaction with diazomethane, was analyzed by high pressure liquid chromatography (HPLC) and gas-liquid chromatography (GLC). Both PA and Py-PA were chromatographed using reverse phase HPLC with a mobile phase of acetonitrile water (60+40). An approximately 2.5-fold increase in absorbance at 254 nm and an increase in retention time of 32 s was observed with Py-PA. As an alternative means of confirmation, Py-PA could also be analyzed by GLC using flame ionization detection. This dual method should prove useful for rapid and efficient detection, quantitation, and coupled HPLC-GLC identity confirmation of low levels of PA. AA

1022 ANON. Quantitative risk assessment. *Food Cosmet. Toxicol.* 18(6); 1980; 711-34

This review considers the issues addressed by the Scientific Committee of the Food Safety Council related to risk assessment as a part of their four-year task to study the body of knowledge regarding food safety testing, and to recommend appropriate criteria to measure the risk of food ingredients. The committee concludes its evaluation of existing models with recommendations. However, as noted, the choice of mathematical procedures for low-dose extrapolations has no firm biological basis and to some extent is arbitrary, The summary of data for the selection of the most appropriate model is concluded at the end of the review. AA

1023 LIU (D). A rapid biochemical test for measuring chemical toxicity. *Bull. Environ. Contam. Toxicol.* 26(2); 1981; 145-9

1024 MERANGER (JC), SUBRAMANIAN (KS) and CHALIFOUX (C). Survey for cadmium, cobalt, chromium, copper, nickel, lead, zinc, calcium, and magnesium in Canadian drinking water supplies. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 44-53

A second national survey was done to ascertain the levels of Cd, Co, Cr, Cu, Ni, Pb, Zn, Ca, and Mg in Canadian drinking water supplies. Raw, treated, and distributed water samples collected from 71 municipalities across Canada were analyzed both by atomic absorption spectrophotometry using the direct method and by an APDC-MIBK extraction procedure. As in the first national survey, the amounts of trace metals found in the 3 types of water samples were essentially the same. Contamination of the water supplies with these metals except Cu and Zn was minimal during treatment and distribution. For Canadian drinking water, the median and extreme values expressed as ng metal/mL water were: Cd $\leq$0.02 ($\leq$0.02-0.07), Co $\leq$2.0 ($\leq$2.0-6.0), Cr $\leq$2.0 ($\leq$2.0-4.1), Cu $\leq$10($\leq$10-900), Ni $\leq$2.0($\leq$2.0-69.0), Pb $\leq$1.0 ($\leq$1.0-79.7), and Zn $\leq$10 ($\leq$10-750). Hardness values as mg $CaCO_3$/L ranged from 6.7 in St. John's, Newfoundland, to 328.3 in Portage La Prairie, Manitoba. The median values for the Canadian drinking water supplies were well below the maximum permissible limits set by Health and Welfare Canada and the World Health Organization. AA

1025 DROZDOWSKI (B) and GORAJ-MOSZORA (I). Reactivation of partially poisoned nickel catalyst by bleaching earth. *J. Am. Oil Chem. Soc.* 57(6); 1980; 171-4

1026 COLLINS (TFX) and BLACK (TN). Effects of FD & C Red No.40 on rat intra uterine development. *Food Cosmet. Toxicol.* 18(6); 1980; 561-8

No embryotoxic or foetotoxic (including teratogenic) effects were observed that could be related to exposure to FD & C Red No.40 by either of the two routes of administration. AA

1027 IKEDA (GJ), SAPIENZA (PP), COUVILLION (JL), FARBER (TM) and VAN LOON (EJ). Comparative distribution, excretion and metabolism of di(2-ethylhexyl) phthalate in rats, dogs and miniature pigs. *Food Cosmet. Toxicol.* 18(6); 1980; 637-42

1028 BRADLAW (JA), GARTHOFF (LH), HURLEY (NE) and FIRESTONE (D). Comparative induction of aryl hydrocarbon hydroxylase activity *in vitro* by analogues of dibenzo-p-dioxin. *Food Cosmet. Toxicol.* 18(6); 1980; 627-35

1029 ANON. Genetic Toxicology. *Food Cosmet. Toxicol.* 18(6); 1980; 683-709

This review considers the issues addressed by the Scientific Committee of the Food Safety Council related to genetic toxicology as a part of their four year task to study the body of knowledge regarding food safety testing and to recommend appropriate criteria for the assessment of the associated risks of the food ingredients. The Committee concludes its evaluation of existing tests with recommendations. However, as noted, any comments on the state of the art in the field of mutagenic testing are necessarily incomplete and provisional, considering the dynamic state of evolution of knowledge in the genetic sciences. AA

1030 ANDERSON (D) and LONGSTAFF (E). An appraisal of mutagenicity test systems. A review. *Analyst.* 106(1258); 1981; 1-22

1031 JATHAR (VS), PENDHARKAR (PB), RAUT (SJ) and PANDAY (VK). Intake of lead through food in India. *J. Food Sci. Technol. (India)* 18(6); 1981; 240-2

Pb content of vegetables, meat and meat products, spices, cereals, pulses, fruits, milk and milk foods and drinking water used in India were determined by atomic absorption spectroscopy. Cereals and pulses contained higher (0.4-1.10 mg/kg) amounts of Pb. The samples of hospitals diet (24 hours collection) analysed showed that the average daily intake of Pb by actual food was 550 µg and per capita daily intake was 478 µg based on Pb content of foods. KAR

1032 GREGORY (JP) III and MANLEY (D). High performance liquid chromatographic determination of aflatoxins in animal tissues and products. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 144-51

A method was developed for the determination of aflatoxins M_1, B_1, G_1, B_2, and G_2 in animal tissues, meat, eggs, and dairy products by high performance liquid chromatography (HPLC). Previous extraction procedures were modified to optimize the precision and recovery of the method. HPLC is performed isocratically with a 5 µm microparticulate octadecylsilica column and fluorometric detection. The analysis is based on treatment of the purified sample extract or standard with trifluoroacetic acid (TFA) to catalyze the hydration of aflatoxins M_1, B_1, and G_1 to the highly fluorescent M_{2a}, B_{2a}, and G_{2a} derivatives. Analysis by HPLC with and without TFA treatment of the extract provides quantitative and qualitative data. The recovery of added aflatoxins and the precision of the recovery depend on the type of sample; mean coefficient of variation for all recovery values was 19.7+ 11.0% for the analysis of liver, ground beef, dairy products, and eggs.

The method was sensitive, with a detection limit of 0.05+1.10 ng/g for each aflatoxin. This procedure provides an alternative to existing thin layer chromatographic methods for determining aflatoxins in animal tissues and products. AA

1033 Van EGMOND (HP) and STUBBLEFIELD (RD). Improved method for confirmation of identity of aflatoxins B_1 and M_1 in dairy products and animal tissue extracts. *J. Assoc. Off. Anal. Chem.* 64(1); 1981; 152-5

A method is described for confirming the identity of aflatoxins B_1 and M_1 in dairy products and liver extracts on a thin layer plate. Extracts and standards containing aflatoxins B_1 and M_1 are spotted on 10x10 cm plates, which are developed 2-dimensionally in mixtures of isopropanol-acetone-chloroform. After the first development, trifluoroacetic acid-hexane (1+4) is sprayed on that part of the plate containing the separated extract components and the undeveloped standard spots of B_1 and M_1, and the plate is heated 6-8 minutes at 75 C. Then the plate is developed in a second direction, and the reaction products of B_1 and M_1 with trifluoroacetic acid from the extract are compared with the same derivatives of the respective standards. The method has been used successfully on extracts of milk, cheese, and liver containing 0.1 ng B_1 or M_1/g and can be completed in 35-45 minutes. AA

1034 JACOB (M). Communicable disease and food poisoning outbreaks. *Environ. Health.* 89(5); 1981; 124

GENERAL

1035 GRANT (RA). Public participation: An introduction. *J. Food Prot.* 43(5); 1980; 410-3

1036 SCHMANDKE (H). Actual problems of research in food science. *Nahrung.* 25(1); 1981; 39-47

The trends towards developments in the field of food production, are discussed. A general research concept is deduced for the essential nutrients," protein" (as an example) which is illustrated by results from studies on protein fibre and protein gel formation. VR

1037 NEWELL (GJ) and LEE (B). Ridge regression: An alternative to multiple linear regression for highly correlated data. *J. Food Sci.* 46(3); 1981; 968-9

The use of ridge regression is proposed to overcome the problem of multicollinearity associated with the use of multiple linear regression in food technology. This technique is discussed and illustrated with an example from food technology. AA

FOOD PROCESSING AND PACKAGING

1038 HAUCK (BW). Control of process variables in extrusion cooking. *Cereal Food World.* 26(4); 1981; 170-3

After classifying different types of extruders, the equipment part including the extruder section components have been discussed. KAR

1039 TEIXEIRA NETO (RO), KAREL (M), SAGUY (I) and MIZRAHI (S). Oxygen uptake and β-carotene decolouration in a dehydrated food model. *J. Food Sci.* 46(3); 1981; 665-9, 76

Oxygen uptake of a model system containing β-carotene was measured by a method capable of determining headspace oxygen and entrapped oxygen,both at low concentrations. β-Carotene was determined colorimetrically at 460 nm. A first-order mechanism was found for this reaction with respect to β-carotene concentration as measured by colour. The values of the rate constants were functions of the oxygen concentrations in the headspace of samples; they increased as these concentrations increased. Up to seven molecules of oxygen were consumed as each molecule of β-carotene was discoloured. This high oxygen consumption was not related to the oxidised products. A methematical model was developed, based on the experimental data, to predict β-carotene decolouration by measuring oxygen uptake or to determine oxygen uptake from decolouration. A computer program was developed to make these predictions. Samples with known histories had linear correlations between oxygen uptake and β-carotene decolouration. The results for 1% and 2% headspace oxygen concentrations agreed with experimental values, presenting a standard deviation compatible with the experimental methods used. An important corollary is the suitability of a simple colorimetric test for monitoring oxygen uptake in a dehydrated system. AA

1040 GRIEVE (PW) and POVEY (MJW). Evidence for the osmotic dehydration theory of freeze damage. *J. Sci. Food Agric.* 32(1); 1981; 96-8

Current views on freeze damage require that a reversal of osmotic flow occurs, on differential freezing across a membrane. This hypothesis has been tested using a variation of the traditional thistle-funnel apparatus. Cellulose acetate membranes were used to retain sucrose solution within the thistle-funnel and the arrangement was immersed in water. The sucrose concentration was measured refractrometrically whilst the water was slowly frozen. Once the water had fully frozen the sucrose concentration was observed to increase, reversing the steady dilution that had been observed before freezing of the water was complete. This concentration effect is consistent with a reversal of osmotic flow on differential freezing across the membrane. The effect was also observed in polyethylene glycol, retained with Amicon diaflo UMOS membranes. AA

1041 ANON. Pallet stretch wrap. *Packag. Eng.* 26(5); 1981; 72

1042 FREEMAN (F). Conveying. The art of moving. *Packag. Rev.* 101(4); 1981; 31-6

FOOD ENGINEERING AND EQUIPMENT

1043 ANAND (SP). Marine-cum-farm product solar dryer. *Invent. Intell.* 16(10); 1981; 459-60

FOOD CHEMISTRY AND ANALYSIS

1044 NEWELL (CJ). A new procedure for comparing methods in food science. *J. Food Sci.* 46(3); 1981; 978, 980

Food science requires the ability to measure the amounts of substances under study. As new methods are developed, it is necessary to compare these methods in terms of their precision and accuracy. In most cases, since an error-free or referee method is not available, there are no "exact" values with which these new method measurements can be compared. To overcome these difficulties, a procedure for comparing methods, which incorporates principal component analysis, is discussed. This procedure is illustrated with an example where methods for the determination of the cholesterol content of cod muscle are compared. AA

1045 MAGA (JA). Pyrroles in foods. *J. Agric. Food Chem.* 29(4); 1981; 691-4

Discusses: occurrence in food; organoleptic properties; and model system studies. BSN

1046 DONOHUE (JA). Automated high pressure liquid chromatography: Modification of the perkin-elmer 420 autosampler to increase sampling efficiency ten fold. *Chromatogr. Newslett.* 8(3); 1980; 59-61

1047 DiCESARE (JL) and VANDEMARK (FL). Use of the perkin-elmer LC-75 variable wavelength detector with autocontrol as an automated US-VIS spectrophotometer. *Chromatogr. Newslett.* 8(3); 1980; 62-4

1048 POILE (A). Recycle liquid chromatography for improved resolution. *Chromatogr. Newslett.* 8(3); 1980; 65-8

1049 CROSBY (NT), HUNT (DC), PHILP (LA) and PATEL (I). Determination of polynuclear aromatic hydrocarbons in food, water and smoke using high-performance liquid chromatography. *Analyst.* 106(1259); 1981; 135-45

A method for the separation of 17 different polynuclear aromatic hydrocarbons (PAHs) has been developed. After separation by thin-layer chromagraphy, the PAHs are examined by high-performance liquid chromatography using ODS and PPS stationary phases. The elution times of all 17 compounds relative to benzo(a)pyrene have been computed. Six representative compounds have been added to bierwurst and to water to check recovery values. Work on stubble smoke has been confined to benzo(a)pyrene only. The method of extraction and clean-up varies with the substrate but the method of determination of the PAH-compounds in the final extract is the same in all three cases. Confirmation of identity is obtained by measuring the peak-height ratios for each PAH at two different excitation and emission wavelength combinations. The limit of detection of benzo(a)pyrene is 0.02 $\mu g\ kg^{-1}$ in food, 0.3 ng l^{-1} in water and 150 pg per filter in smoke. Recoveries of the six representative compounds are generally in the range 75-100% at levels approaching the limit of detection. AA

1050 SCHULTZ (JC), BALDWIN (IT) and NOTHNAGLE (PJ). Hemoglobin as a binding substrate in the quantitative analysis of plant tannins. *J. Agric. Food Chem.* 29(4); 1981; 823-6

1051 STIJVE (T). Gas chromatographic determination of inorganic bromide residues - a simplified procedure. *Dtsch. Lebensmittel-Rundschau.* 77(3); 1981; 99-101

The gas chromatographic method for inorganic bromide residues (based on conversion of bromide ion to 2-bromoethanol by reaction with ethylene oxide) was critically examined. It was observed that the method could be advantageously modified by using another way of dispensing the reagent to the test portion and by shortening the reaction time and changing extraction conditions. In addition, the whole procedure could be miniaturized enabling the analyst to perform bromide determinations on as little as 100 mg material. A detailed description of the modified method is given. AA

1052 LANG (KW), McCUNE (TD) and STEINBERG (MP). A proximity equilibration cell for rapid determination of sorption isotherms. *J. Food Sci.* 46(3); 1981; 936-8

An equilibration method which retains the saturated salt solution but accelerates the rate of equilibration has been devised. The acceleration is achieved by reducing the size of the desiccator which would provide the necessary area to volume ratio. In the plastic chamber (65 m/53 mm) used, the surface area to vapour volume ratio was 0.3101 as compared to 0.0335 for the standard desiccator. To achieve the shortest and most direct water vapour path which would give the optimum condition for water transfer inside the chamber, the weighing dish was modified by removing a 40-mm diameter circular section from the bottom. This was replaced with a 55 mm diameter wide of Whatman No. 1 quantitative filter paper to suppose the sample and at the same time allow moisture transmission. This modified tray in the chamber was turned the proximity equilibration cell (PEC). PEC was compared with the conventional desiccator for equilibration to 0.842 a_w at 21.7 C using duplicate 2 g samples of corn starch. The time taken in PEC was

only 6 days while the conventional desiccator took 21 days, thus giving a 70% reduction in time. MVG

1053 LANG (KW) and STEINBERG (MP). Predicting water activity from 0.30 to 0.95 of a multicomponent food formulation. *J. Food Sci.* 46(3); 1981; 670-2, 680

The equation developed is a combination of the Smith isotherms and the Lang-Steinberg mass balance: $\log (1-a_w) = (MW - \sum(a_i w_i))/ \sum (b_i w_i)$ where M is moisture content of the mixture, W is the total dry weight, a_i and b_i are Smith isotherms parameters for the individual ingredient, and w_i is the dry weight of the ingredient. MVG

1054 HART (JP), SMYTH (MR) and SMYTH (WF). Voltammetric determination of 2-, 3- and 4-chloroaniline in mixtures. *Analyst.* 106(1259); 1981; 146-52

1055 HEANES (DL). Determination of trace elements in plant materials by a dry-ashing procedure. Part I. Cobalt and molybdenum. *Analyst.* 106(1259); 1981; 172-81

1056 HEANES (DL). Determination of trace elements in plant materials by a dry-ashing procedure. Part II. Copper, manganese and zinc. *Analyst.* 106 (1259); 1981; 182-7

1057 PRENTO (P) and PRENTO (A). Determination of microgram amounts of calcium in small biological samples of EDTA titration using Patton and Reeder's indicator. *Analyst.* 106(1259); 1981; 227-30

1058 FLAMERZ (S) and BASHIR (WA). Spectrophotometric determination of nitrite in waters. *Analyst.* 106(1259); 1981; 243-7

1059 GOMBOCZ (E), HELLWIG (F), VOJIR (F) and PETUELY (F). On the achievable accuracy of enzymatic analysis procedures with foodstuffs using a centrifugal analyser for automatic analysis. *Dtsch. Lebensmittel-Rundschau.* 77(1); 1981; 1-26 (German)

The present article includes a survey of 22 methods adapted for the centrifugal analyser. (Glucose, galactose, D-sorbitol, glutamic acid, citric acid, isocitric acid, gluconic acid or gluconolactone, D-lactic acid, L-lactic acid, maleic acid, formic acid, glycerol, ethanol, urea, fructose, lactose, maltose, saccharose, oligosaccharides, starch, creatinine, inhibition of cholinesterase). The precision of the conventional method has been compared with that of a centrifugal analyser with light path in longitudinal direction. The centrifugal analyser enables one to achieve a significant rationalization as well as greater precision in enzymatic procedures of food analysis. KMD

1060 BELIKOV (VM), ANTONOVA (TV) and BEZRUKOV (MG). The effect of heating of various proteins on their cleavability of proteolytic enzymes. *Nahrung.* 25(1); 1981; 91-7 (German)

FOOD MICROBIOLOGY

1061 WU (YC), SMITH (ED) and HUNG (YT). Modeling of rotating biological contactor systems. *Biotechnol. Bioeng.* 22(10); 1980; 2055-64

1062 MIYASAKA (Y), RHA (C) and SINSKEY (AJ). Application of temperature-sensitive mutants for single-cell protein production. *Biotechnol. Bioeng.* 22(10); 1980; 2065-79

1063 OOSHIMA (H), SAKIMOTO (M) and HARANO (Y). Characteristics of immobilised invertase. *Biotechnol. Bioeng.* 22(10); 1980; 2155-67

1064 OOSHIMA (H), SAKIMOTO (M) and HARANO (Y). Kinetic study of thermal stability of immobilized invertase. *Biotechnol. Bioeng.* 22(10); 1980; 2169-78

1065 SCHELLER (WA). Grain alcohol as renewable energy and automotive fuel. *Starch.* 33(1); 1981; 1-4

Ethanol made from starch or sugar is a renewable fuel. A mixture of 10% ethanol and 90% unleaded gasoline, called gasohol, has been tested in a 3.3 million km program and is shown to provide better fuel economy and less pollution than unleaded gasoline. In large plants using maize as raw material, ethanol can be produced profitably at 36 cents/l. For each litre of ethanol which is blended with 9ℓ of unleaded gasoline, there is a reduction of atleast 1.23ℓ of crude oil usage. VR

1066 ERICSSON (M), EBBINGHAUS (L) and LINDBLOM (M). Single-cell protein from methanol:Economic aspects of the Norprotein process. *J. Chem. Technol. Biotechnol.* 31(1); 1981; 33-43

Norprotein is a subsidiary of the Norwegian chemical group Norsk Hydro A-S and the Swedish food company AB Marabok. Since 1974, the main activity of research has been to develop a process for single-cell protein production from methanol. At present, research activities are directed towards findings alternative applications for the developed technology within the field of biotechnology. AA

1067 YAMAMOTO (K), TOSA (T) and CHIBATA (I). Continuous production of L-alanine using *Pseudomonas dacunhae* immobilized with carrageenan. *Biotechnol. Bioeng.* 22(10); 1980; 2045-54

1068 DOORES (S) and WESTHOFF (D). Heat resistance of *Sporolactobacillus inulinus*. *J. Food Sci.* 46(3); 1981; 810-12

1069 BOSTIAN (M) and GILLILAND (SE). Relationship of survival of *Kluyveromyces fragilis* at -19 C to cellular fatty acid composition. *J. Food Sci.* 46(3); 1981; 964-5

Concentrated cultures of *Kluyveromyces fragilis* prepared from cells grown in a pepsinised whey medium were frozen at -19 C for 24 hours. The eight strains of *K. fragilis* included in this study exhibited wide differences in survival. As the percentage of dodecanoic acid in the cells increased, the percentage of survivors after freezing also increased. AA

1070 D'SOUZA (SF) and NADKARNI (GB). Immobilized catalase-containing yeast cells: Preparation and enzymatic properties. *Biotechnol. Bioeng.* 22(10); 1980; 2191-205

1071 WONG (HC) and KOEHLER (PE). Mutant for Monascus-pigment production. *J. Food Sci.* 46(3); 1981; 956-7

Pigment production of a new mutant strain, high in pigment productivity, but low in antibacterial activities, has been reported. MVG

ALGAE

1072 CAIN (JR), PASCHAL (DC) and HAYDEN (CM). Toxicity and bioaccumulation of cadmium in the colonial green algae *Scenedesmus obliquus*. *Arch. Environ. Contam. Toxicol.* 9(1); 1980; 9-16

MUSHROOM

1073 COOPER (D). Mushrooms through the ages. *Mushroom J.* No. 102; 1981; 189-91

1074 PURI (YN), REHILL (PS) and SINGH (B). Cultivation trials of *Pleurotus fossulatus*. *Mushroom J.* No. 102; 1981; 209-14

1075 VAN-ZAAYEN (A). Diseases and pests of cultivated mushrooms: Bacterial Diseases. 1. Literature and research. *Mushroom J.* No. 102; 1981; 193-6

FOOD ADDITIVES

1076 JURGENS (U). High pressure liquid chromatographical analysis of flavours: Investigating foodstuffs tasting of vanilla. *Dtsch. Lebensmittel-Rundschau.* 77(3); 1981; 93-6 (German)

HPLC will make it possible to rapidly and specifically determine flavour components essential in the examination of foodstuffs and concentrates having taste of vanilla. Working-up procedures are described that will require as little time as possible. In order to determine the ratio between vanillin and P-hydroxybenzaldehyde in natural vegetable materials, the author examined 29 vanilla pods. To make a reliable statement on possible additions of synthetic vanillin to the natural extracts, it would be necessary to inquire also into the behaviour of flavouring substances (e.g. oxidizability) over extended storage periods. KMD

1077 WANG (CF), CASSENS (RG) and HOEKSTRA (WG). Fate of ingested 15N-labelled nitrate and nitrite in the rat. *J. Food Sci.* 46(3); 1981; 745-8

Single and multiple dose studies were conducted. It was found that by 72 hours after discontinuation of administration, 60-70% of the dose of ^{15}N-labelled nitrate was extracted in the urine and 10-20% in the feces. About 10% after single dose and 3-4% after multiple doses of residual ^{15}N remained in the body carcass. About 50% or more of excreted ^{15}N was not analysable as nitrate or nitrite chemically. Chemical analysis showed about 30% of the dose excreted in the urine as nitrate + nitrite, the excretion in the feces

being very low. The blood and organs showed negligible amounts of nitrate-N or nitrite-N. Most of the nonnitrate - ^{15}N and nonnitrite - ^{15}N was also excreted rapidly from the body. MVG

CEREALS

1078 VANDERSLICE (JT), MAIRE (CE) and YAKUPKOVIC (JE). Vitamin B_6 in ready-to-eat cereals: Analysis by high performance liquid chromatography. *J. Food Sci.* 46(3); 1981; 943-6

Twenty-four ready-to-eat cereals obtained locally were analysed for their vitamin B_6 content by a recently developed high performance liquid chromatographic (HPLC) procedure. The method uses sulphosalicylic acid as an extraction agent with subsequent qualitative and quantitative analysis by anion exchange chromatography. All six forms of vitamin B_6 plus their metabolite, pyridoxic acid, can be identified and quantified. Spot checks of the results obtained with this method and with a radiometric-microbiological assay give agreement to within 5%. On the other hand, disagreements of up to 38% are found on comparison with the standard AOAC microbiological procedure used by a commercial laboratory. The results indicate no significant variations between boxes within the same lot, but in one-third of the cereals tested, significant variations were found from lot to lot. AA

PADDY

1079 VASAN (BS) and USHARANI (G). Comparative study of different commercial methods of parboiling, with special reference to their soaking, milling and cooking qualities. *Bull. Grain Technol.* 18(1); 1980; 29-34

Some of the well known and commercially adopted parboiling methods like the cold soaking method, and the hot soaking (CFTRI) method and some recently developed methods like pressure parboiling and the RPEC parboiling were compared and reported for their dry matter loss, head rice yield, milling breakage, cooking time, water uptake and for reflectance. Based on the results, these parboiling methods have been classified into over parboiled, optimum parboiled and under parboiled. AA

1080 ANAND PRAKASH, PASALU (IC) and MATHUR (KC). Evaluation of plant products as grain protectants against insect pests of stored paddy. *Bull. Grain Technol.* 18(1); 1980; 25-8

Plant products were tested against two major insect pests of stored paddy, *Sitotroga cerealella* Oliv. *Rhizopertha dominica* F. to find out their effectiveness as grain protectants at 10 to 350 ppm concentration. The larvae and adults of the pests were counted after the completion of one generation in the treated grains. The order of effectiveness was malathion > pyrethrum > garlic extract > neem oil > neem extract > onion extract for *S. cerealella* and malathion > pyrethrum > garlic extract > neem oil = neem extract > onion extract for *R. dominica*. AA

RICE

1081 PRAKASH (A). Influence of age on fecundity and fertility of lesser grain borer *Rhizopertha dominica* F. and Rice weevil *Sitophilus oryzae* L. in stored rice. *Bull. Grain Technol.* 18(2); 1980; 119-21

RYE

1082 RATHORE (YS), SACHAN (GC) and BHATTACHARYA (AK). Dry matter utilization of rye, wheat, and triticale by *Ephestia cautella* (Walker). *Bull. Grain Technol.* 18(2); 1980; 122-6

WHEAT

1083 VAN LONKHUYSEN (HJ) and AUTRAN (JC). Improving European wheat variety identification. *Milling Feed Fert.* 164(1); 1981; 17-9

Discusses: second inter-lab test; principle; method of procedure and comparison of results with data obtained from other methods. BSN

1084 POPLI (S) and DHINDSA (KS). Quality characteristics of improved wheat varieties of Haryana and Punjab. *Bull. Grain Technol.* 18(1); 1980; 10-16

Seven high yielding wheat varieties of (WH-147, WH-157, WL-771, HD-2009, C-306, Sonalika and Kalyan sona) Haryana and Punjab, were analysed for proximate composition, albumin, globulin, prolamin and glutelin, total reducing and non-reducing sugars;diastatic activity; carbohydrate digestibility, Pelshenke value and sedimentation value. Moisture, ash, protein, fat, crude fibre non-fat extractives and contents ranged from 6.68 to 8.45; 1.58 to 2.00; 8.88 to 12.09; 1.09 to 3.06; 0.98 to 1.44 and 74.14 to 79.06 per cent respectively. Ca and P contents ranged from 64 to 139 and 149 to 373 mg/100g, respectively. Protein fractions showed greater variations. Albumin and globulin contributed about 16 and 12 per cent of the total proteins, respectively, whereas prolamin and gluten fractions accounted for > 60 per cent of the total proteins. The reducing, non-reducing and total sugars contents ranged from 60 to 85 mg maltose/10g; 55 to 200 mg sucrose/10 g and 137 to 311 mg maltose/10 g flour, respectively. Diastatic activity ranged from 282 to 412 mg maltose/10 g flour. Pelshenke and sedimentation values varied from 91 to 149 minutes and from 9 to 33 ml, respectively. Varieties WH-147, WH-157, WL-711 and Kalyan Sona have been found to be good for chapati making, whereas C-306 and Sonalika are suitable for both chapaties and biscuits, HD-2009 could be used for biscuits, cakes, pasteries and cookies. AA

1085 THORPE (GR). The aeration of wheat in the climate of North India. *Bull. Grain Technol.* 18(1); 1980; 3-9

Natural aeration is the process whereby a bulk of grain is cooled by forcing through it naturally occurring cold air. Some overall drying of the grain may also occur during the initial cooling process even though air of very high relative humidity can be chosen for aeration. The objective of this paper is to use a mathematical model to investigate the feasibility of natural aeration in the climate of North India. It is shown that beginning in November, selection of the coldest air occurring for 50% of the time at New Delhi for the first month of aeration, and subsequently for the coldest 15% of the time results in initially 11.5% (wet basis) moisture grain being cooled to about 13.5 C when the air flow rate is 11/s per tonne of

grain aerated. This aeration strategy results in only a modest build up of grain moisture content in the vicinity of the aeration ducts. In March, the aerated grain bulk begins to increase in temperature and at this point it may be advisable to cease aeration. It is pointed out, however, that the thermal properties of a large grain-mass are such that the average grain temperatures increases only gradually over the summer when aeration is least feasible. BSN

1086 SINGH NAGI (HPP) and BAINS (GS). Density pattern in wheat as influenced by conditioning variables. *Bull. Grain Technol.* 18(2); 1980; 93-9

Density pattern in two bread wheats WG 357 and WG 377, as influenced by the conditioning variables (moisture: 14.5, 15.5 and 16.5%; tempering time 24,48 and 72 hour) was investigated. The relationship of density and moisture in wheat kernels was curvilinear with a density gradient of 0.008 g/cm^3 with 1% difference in moisture. The influence of conditioning with and without scouring and tempering times on the density of wheat is presented graphcally. Scouring of grains and temperature had great influence on water uptake of wheat; scouring and higher temperature (15 to 40 C) facilitated faster penetration of moisture. BSN

1087 PRICE (NR), BUNYAN (PJ) and LOVEDER (CJ). The effect of methyl bromide on esterase activity in wheat. *J. Sci. Food Agric.* 32(1); 1981; 17-20

Fumigation of wheat with methyl bromide causes a change in the polyacrylamide gel, isoelectric focusing profile of esterase proteins from aqueous extracts of wheat. The significance of this effect is discussed in the light of known reactions of methyl bromide in stored products. AA

1088 YU (MHM) and MILLER (LT). Influence of cooked wheat bran on bowel function and fecal excretion of nutrients. *J. Food Sci.* 46(3); 1981; 720-23

In the study, divided into three 18-day periods, with 10 men, cooked wheat bran (15g uncooked) added to the diet increased fecal wet and dry weight and fecal neutral detergent fiber (NDF). There was no significant increase in fecal moisture. Significant correlations were obtained between fecal NDF and fecal wet and dry weight and moisture. Intestinal transit time was not affected by the cooked bran. The increases in the fecal excretion of energy, nitrogen and ash were of little nutritional significance in subjects receiving an adequate diet. MVG

1089 SIMWAT (GS) and CHAHAL (BS). Effect of storage period and depth of stored grains on the insect population and the resultant loss of stored wheat with the farmers. *Bull. Grain Technol.* 18(1); 1981; 35-41

6 farmers bulk wheat stores were visited from June to October at monthly intervals and grain samples were drawn at 5, 30 and 75 cm depths and analysed for insect population, loss in weight, kernel damage and loss of germination. The samples showed the presence of *R. dominica*, *S. Oryzae*, *S. cerealella*, *T. granarium* and *T. castaneum*. The insect population increased from 0.08 to 3.00/500 g wheat with storage period and it decreased with increase in depth of stored grains. The loss in weight, kernel damage and loss of germination of wheat varied from 0-1.25, 0-3.25 and 1.35-4.45% and the loss of wheat decreased with the increase in depth of stored grains. AA

1090 LAWRENCE (JF), PANOPIO (LG) and McLEOD (HA). Analysis of difenzoquat herbicide in wheat products by reversed-phase liquid chromatography. *J. Agric. Food Chem.* 29(4); 1981; 887-9

Difenzoquat (1,2-dimethyl-3,5-diphenylpyrazolium methyl sulphate), a herbicide used for the control of wild oats, was determined in wheat products

by reversed-phase ion-pair chromatography employing a LiChrosorb RP-8 column and a mobile phase of 70% acetonitrile in water containing 0.01 M sodium octanesulphonate, adjusted to pH 3.0. Samples of bread, cereal, and flour were extracted with acidified acetonitrile, which was cleaned up by aqueous/organic partitions at acidic and basic pH values. The organic extract was then further purified by passing through an alumina column. The elution fraction containing the difenzoquat was evaporated to dryness and dissolved in the mobile phase for analysis. Recoveries of spiked samples over the range 0.5-10.0 ppm averaged 88.6% with a range of 83.5-99.2%. At 0.1 ppm, the average recovery was 75.3% with a range of 68.1-85.9%. The detection limit was estimated to be ~0.02 ppm in the samples studied. AA

MILLETS

1091 CHANDRASEKHER (G), SURYAPRASAD RAJU (D) and PATTABIRAMAN (TN). Natural plant enzyme inhibitors. α-amylase inhibitors in millets. *J. Sci. Food Agric.* 32(1); 1981; 9-16

Sorghum (12 varieties) (*Sorghum bicolor*), pearl millet (*Pennisetum typhoideum*) (14 varieties), setaria (*Setaria italica*) (12 varieties), ragi (*Eleucine coracana*) (4 varieties), echinocloa (*Echinocloa colona*) (11 varieties), proso (*Panicium miliaceum*) (13 varieties), Kodo (*Paspalaum scorbiculatum*) (11 varieties) and miliare((*Panicium miliare*) (11 varieties) were screened for their inhibitory activity against human salivary amylase. Echi nodoa, proso, kodo and miliare had no detectable activity. All other seeds had activity, the highest being observed in sorghum. KAR

PEARL MILLET

1092 EMIOLA (LO) and De La ROSA (LC). Characterisation of pearl millet nonstarchy polysaccharides. *J. Food Sci.* 46(3); 1981; 781-5

Water soluble (WSNP) and water insoluble (WINP) nonstarchy polysaccharides of pearl millet were isolated, purified and characterised for carbohydrate composition. The derived alditol acetates of hydrolysed WSNP and WINP were analysed by gas-liquid chromatography and their respective DEAE-cellulose fractions showed similarities in carbohydrate content, but marked differences in distribution pattern. Rhamnose, ribose, L-arabinose, xylose, mannose, galactose and glucose were detected. Arabinoxylan was confirmed as the predominent polysaccharide by Sepharose 4B chromatography, with significant amount of arabinogalactan and glucan noticeable in some fractions. The major phenolic compound was ferulic acid, in addition to caffeic acid and two other unidentified phenolic acids, as showed by UV spectral analysis and TLC. MVG

SORGHUM

1093 MUINDI (PJ), THOMKE (S) and EKMAN (R). Effect of magadi soda treatment on the tannin content and *in vitro* nutritive value of grain sorghums. *J. Sci. Food Agric.* 32(1); 1981; 25-34

Treatment of sorghum grains with 4 g/l of magadi soda (RMS, a sodium sesquicarbonate salt) for 3 days reduced the level of assayable tannins in the grains by 40 to 57%. Treatment of high tannin sorghums increased the *in vitro* protein digestibility, while no increase was observed for the low-

tannin sorghums. Use of solutions containing > 37.5 and 9 g RMS per litre resulted in reduced protein digestibility of the high- and low-tannin containing sorghums respectively. KAR

1094 KAZANAS (N) and FIELDS (ML). Nutritional improvement of sorghum by fermentation. *J. Food Sci.* 46(3); 1981; 819-21

Lactic fermentation of ground grain significantly increased ($p < 0.001$) available lysine/leucine, isoleucine and methionine. Similar increase was evident with protein quality expressed as relative nutritive value. There were also significant increases in niacin and thiamin ($p < 0.001$) and riboflavin ($p < 0.05$). Availability of protein and carbohydrate appeared to be more after fermentation. The proximate analysis, however, did not change with fermentation. MVG

1095 BORIKAR (PS). Population of *Sitophilus oryzae* Linn. in different sorghum grains. *Bull. Grain Technol.* 18(1); 1980; 77-8

MAIZE

1096 SIMMS (RL). Computer control in the corn industry - status and future. *Starch.* 33(1); 1981; 4-6

Attitudes of engineering people in the industry is rapidly changing in favour of computer based systems. However, attitudes of production and company management are still conservative. Most new facilities will have computer based instrumentation. There will be an increase in the number of applications in existing plants to make them more efficient. Systems of the future will feature distributed control and a trend away from the central control room. AA

1097 IKAWA (Y), GLOVER (DV), SUGIMOTO (Y) and FUWA (H). Some structural characteristics of starches of maize having a specific genetic background. *Starch.* 33(1); 1981; 9-13

The sugary-1(Su_1), sugary-2(Su_2) and dull (du) mutants produced high amylose maize, while amylopectin of Su_2 was normal type and those of Su_1 and du were novel type. In the double-mutant combinations, the waxy (wx) gene decreased amylose content. Starches of du Su_1 or du Su_2 possessed greatest amount of amylose among starches examined. Contents of amylose, intermediate fraction (Fr) and longer branches of amylopectin increased in most cases when the amylose extender (ae) gene was introduced. Starches of ae possessed longer average chain-lengths of amylopectin than that of normal. In ae du starches, however, elongation of the amylopectin chain and increase of the intermediate Fr. did not occur. Exhaustive degradation of starch granules by glycoamylase showed that ae starches were more resistant to amylase. AA

1098 ROUSHDI (M), GHALI (Y) and HASSANEAN (A). Factors improving the steeping process of corn grains. Part II. Effect of enzyme addition. *Starch.* 23(1); 1981; 7-9

The effect of addition of proteolytic enzymes to the steeping liquor of corn grains was studied to reduce the steeping period and to obtain starch of low protein content. For this purpose, the intact, scratched, and broken corn grains were steeped in presence of Alcalase and Neutrase enzymes. It was found that the steeping period decreased by about 50% in case of broken grains, while steeping intact or of scratched corn grains in presence of the enzymes gave no effect. AA

1099 BERRY (MR) Jr. and DICKERSON (RW) Jr. Heating characteristics of whole kernel corn processed in a steritort. *J. Food Sci.* 46(3); 1981; 889-95

1100 HAHN (MH), KUENNEN (RW), CARUSO (JA) and FRICKE (FL). Determination of trace amounts of selenium in corn, letuce, potatoes, soyabeans and wheat by hydride generation/condensation and flame atomic absorption spectrometry. *J. Agric. Food Chem.* 29(4); 1981; 792-6

Because of the nutritional and toxicological significance of low selenium concentrations in agricultural crops, a sensitive, accurate, and precise method for selenium analysis at part per billion levels is required. A procedure utilising wet digestion followed by hydride generation/condensation-flame atomic absorption has been developed for and routine analysis of selenium in different varieties of soyabeans, wheats, potatoes, lettuce, and sweet corn. The lowest quantifiable level, based on 2 g of sample, is 1 ng/g (dry weight) for all crop types studied. The precision for the total analysis is 3.7% relative standard deviation (RSD) at a mean concentration of 100 ng/g and 13% RSD at a mean concentration of 1 ng/g. Sample recoveries precision studies, and analyses of NBS reference materials demonstrate the reliability and accuracy of this technique. A summary of results for 830 crop samples is reported. AA

1101 COLLINS (GJ) and ROSEN (JD). Distribution of T-2 toxin in wet-milled corn products. *J. Food Sci.* 46(3); 1981; 877-9

Contaminated corn was wet milled and distribution of T-2 toxin was studied. About two-thirds of the toxin was removed by the steep and process water, 4% was found in starch and the rest was distributed between germ, gluten and fiber. In the germ, T-2 toxin was 163-194% of that found in corn from which it was obtained; in starch it was 6.6-8.8%. There was a relationship between steep water concentration and T-2 concentration in original corn and the products for human consumption, and therefore, this was considered as possible substrate for toxin assay. MVG

1102 UMOH (V) and FIELDS (M). Fermentation of corn for Nigerian agidi. *J. Food Sci.* 46(3); 1981; 903-5

1103 FIELDS (ML), HAMAD (AM) and SMITH (DK). Natural lactic acid fermentation of corn meal. *J. Food Sci.* 46(3); 1981; 900-902

Lactobacillus fermentum, *L. cellobiosus* and *Pediococcus acidilactici* were isolated from corn meal subjected to natural lactic acid fermentation (mixing with water and incubated at 37 C). By the second day, viable coliforms, yeast and molds disappeared. The lactic acid bacteria dominated during the four days of fermentation. Higher yield of dry solids was obtained at low water levels, as the higher levels of acids present inhibited the flora which prevented breakdown of the substrate to a lesser extent. MVG

PULSES

1104 FLEMING (SE). A study of relationships between flatus potential and carbohydrate distribution in legume seeds. *J. Food Sci.* 46(3); 1981; 794-8,803

Flatulance potential in relation to carbohydrate composition of seven legume seeds (navy bean (NB), red kidney bean (RK), wrinkled-seeded field pea (WP), garbanzo bean (GB) smooth seeded field pea (SP), mung bean (MB) and green lentil (GL), was investigated by rat assay. Highest level of hydrogen was produced by NB, RK and WP, GB and SP gave intermediate values,

while MB and GL gave values not significant from a non-flatulant diet. There was significant positive correlations between hydrogen production and the following carbohydrate material: stachyose, raffinose + stachyose, and acid hydrolysable glucans and pentosans. Again, significantly, there were negative correlations between hydrogen production and starch or lignin contents. MVG

1105 JACKSON (GM) and VARRIANO-MARSTON (E). Hard-to-cook phenomenon in beans: Effects of accelerated storage on water absorption and cooking time. *J. Food Sci.* 46(3); 1981; 799-803

Stored beans (7-14 days at 41 C and 100% RH) needed more cooking time than fresh beans. With corrections for loss of solids during soaking, no differences were evident in water absorption between stored and fresh beans. In stored beans, there was higher rate of electrolyte leakage indicating the deterioration of cotyledons during ageing, There was positive relationship between moisture content and cooking time; the higher the moisture content during soaking, the shorter the cooking time. However, the differences in cooking times between fresh and aged beans was regardless of moisture content. MVG

1106 KILGORE (SM) and SISTRUNK (WA). Effects of soaking treatments and cooking upon selected B-vitamins and the quality of blackeyed peas. *J. Food Sci.* 46(3); 1981; 909-11

1107 GEERVANI (P) and THEOPHILUS (F). Influence of legume starches on protein utilisation and availability of lysine and methionine to albino rats. *J. Food Sci.* 46(3); 1981; 817-8

PER, digestibility coefficient, biological value on NPU of starch extracted from red gram (*Cajanus cajan*), Bengal gram (*Cicer arietinum*), black gram (*Phaseolus mungo*) and green gram (*Phaseolus aureus*) was investigated by rat assay. Availability of lysine and methionine to rats was also studied. The starches from black gram and green gram promoted growth similar to corn starch; red gram and Bengal gram starch promoted growth to a significantly less ($p < 0.05$) extent. Red gram starch supplementation reduced significantly the digestibility of casein as compared to other legume starches; biological value of casein did not significantly differ when supplemented with starches from the four legumes. However, NPU of casein supplemented with black gram starch was significantly ($p < 0.05$) higher than with other starches. Lysine availability was higher with *Phaseolus* starches than with other starches. MVG

1108 GEERVANI (P) and THEOPHILUS (F). Studies on digestibility of selected legume carbohydrates and its impact on the pH of the gastrointestinal tract in rats. *J. Sci. Food Agric.* 32(1); 1981; 71-8

A study on the digestibility of legume carbohydrates in unprocessed and processed grain and also in the starch isolated from the grain was carried out by *in vitro* and *in vivo* methods. The legumes selected were red gram (*Cajanus cajan* cv. Hyd. 3A). Bengal gram (*Cicer arietinum* cv. BEG 482), black gram (*Phaseolus mungo* cv. T9) and green gram (*Phaseolus aureus* cv PS 16). The processes tested were boiling, pressure cooking, roasting, germination, fermentation and parching. The digestibility *in vitro* was assessed on the basis of maltose released after amylolysis and digestibility *in vivo* was assessed on the basis of carbohydrate intake and excretion. Digestibilities of the *Phaseolus* varieties were superior to red gram and Bengal gram. Roasting did not improve the digestibility of any legume as much as boiling and pressure cooking. The digestibility of fermented and germinated legumes

was not much higher than the legumes processed by other methods. The increasing order of digestibility *in vivo* was red gram < Bengal gram < black gram and < green gram. Significant differences were noticed in the digestibility *in vivo* of moist and dry heat-treated legumes, and between *Phaseolus* starches and red gram and Bengal gram starch. The pH values of stomach, duodenum and small intestine contents of rats fed legume diets was greater than the pH values at similar sites in rats fed casein protein, whereas the pH values in the caecum of rats fed on legume diets was acidic and that of casein-fed rats was neutral. Caecum weight of rats fed on red gram and Bengal gram diets was significantly higher ($P < 0.05$) than black gram- and green gram-fed groups. AA

BROAD BEAN

1109 SCHWENKE (KD), PRAHL (L), RAUSCHAL (E), GWIAZDA (S), DABROWSKI (K) and RUTKOWSKI (A). Functional properties of plant proteins. Part 2. Selected physicochemical properties of native and denatured protein isolates from faba beans, soyabeans, and sunflower seed. *Nahrung*. 25(1); 1981; 59-69

Proteins isolated under mild conditions showed the highest solubility. Characterisation by a sharp minimum of solubility at a rather narrow range of pH. The proteins denatured by acid showed an increased water adsorption capacity. The emulsion activity and stability were not or only slightly influenced, but the emulsifying capacity was strongly decreased by the denaturation procedure. The sunflower protein showed the highest emulsifying capacity. Increasing the pH from the isoelectric range to 7 improves all studied functional properties. VR

1110 SCHMANDKE (H), MAUNE (R), SCHUHMANN (S) and SCHULTZ (M). Contribution to the characterisation of acetylated protein fractions of *Vicia faba* in view of their functional properties. *Nahrung*. 25(1); 1981; 99-109

The emulsifying properties of the protein fraction of *Vicia faba* are not essentially influenced by acetylation. The continuous decrease of the shear modulus of gels from acetylated *Vicia faba* proteins with increasing contents of sunflower oil could be explained by an increased protein-lipid interaction. By changes of pH and by influence of added NaCl, $CaCl_2$, $AlCl_3$ and starch, the shear modulus of gels of acetylated protein fractions of *Vicia faba* can be increased. VR

COW PEA

1111 AKPAPUNAM (MA) and MARKAKIS (P). Protein supplementation of cowpeas with sesame and watermelon seeds. *J. Food Sci.* 46(3); 1981; 960-1

1112 AKPAPUNAM (MA) and MARKAKIS (P). Physicochemical and nutritional aspects of cowpea flour. *J. Food Sci.* 46(3); 1981; 972-3

Cowpea (*Vigna unguiculata*) flour was prepared by soaking the beans in 25 C tap water for 18 hours, drying in an air draft, milling to a coarse powder, removing the seed coat by an air jet, autoclaving the powder at 121 C for 10 minutes redrying in an air draft and grinding to a fine flour. The flour was creamy-white, free-flowing, nonhygroscopic and dispersed readily in water. The conversion of cowpeas to flour resulted in 10% loss of thiamin and riboflavin and 30% loss of niacin. Also, the flour contained less K, P, and Mg but more Ca and Na than the raw cowpeas. AA

WHITE BEAN

1113 SATHE (SK) and SALUNKHE (DK). Solubilization of California small white bean (*Phaseolus vulgaris* L.) proteins. *J. Food Sci.* 46(3); 1981; 952-3

California Small White beans contained 25.90% crude protein on dry weight basis. Albumins accounted for 11.30% of the total crude proteins. Alkali (1N NaOH) extractable proteins had an isoelectric pH of about 4.0. About 88% of the total crude proteins were recovered employing acid/alkali extraction. Polyacrylamide gel electrophoretic analyses indicated that the acid soluble proteins were comprised of at least five components, whereas the alkali soluble proteins consisted of at least two components. AA

WINGED BEAN

1114 De LUMEN (BO) and BELO (PS) Jr. Inhibitors of trypsin and chymotrypsin in winged bean (*Psophocarpus tetragonolobus*) tubers. *J. Agric. Food Chem.* 29(4); 1981; 884-6

1115 UMADEVI (S) and WANKHEDE (DB). Isolation and physicochemical properties of starch from winged bean (*Psophocarpus tetragonolobus*). *Starch.* 33(1); 1981; 23-6

Preparation and physicochemical properties of winged bean starch have been studied. Gelatinisation temperature range was 60-70 C and it exhibited single stage swelling and low solubility. The extensive solubility in dimethylsulphoxide may be due to heterogeneous bonding forces within the granule. The amylolytic susceptibility of native and gelatinized starch with human salivary α-amylase and glucoamylase was studied. The starch was found to be nonionic. The amylose content was 38.5%. AA

OILSEEDS AND NUTS

GROUNDNUT

1116 PATTEE (HE), YOUNG (CT) and GIESBRECHT (FG). Seed size and storage effects on carbohydrates of peanuts. *J. Agric. Food Chem.* 29(4); 1981; 800-2

Different sizes of peanut seeds exerted varying and significant effect on fructose, glucose, inositol, ribose, sucrose and stachyose content when stored at 4 C and 65% RH. Storage period did not exert any influence on raffinose and ribose, while it did so on all other carbohydrates. The relationship between carbohydrate content and physiological maturity of seed size of Florigiant peanut has been discussed. BSN

1117 ALID (G), YANEZ (E), AGUILERA (JM), MONCKEBERG (F) and CHICHESTER (CO). Nutritive value of an extrusion-texturised peanut protein. *J. Food Sci.* 46(3); 1981; 948-9

Defatted peanut flour was texturised in a Wenger X-25 extruder at 25.1% moisture content and 140 C product temperature. Texturisation did not have any significant effect on the amino acid pattern nor on the PER of defatted flour. For example, the PER of the flour was 1.57 as compared to 1.54 for the textured product. Supplementation of both products with 0.3% DL-threonine, 0.2% L-lysine and 0.2% DL-methionine resulted in a 39 and 41% increase in PER, respectively (PER = 2.18). AA

CASHEW

1118 BALASUBRAMANIAM (D). The Indian cashewnut story. *Peanut J. Nut World.* 60(4); 1981; 8-14

Discusses: nut; processing; roasting; shelling; drying; peeling; grading; packing; and exports. BSN

SOYABEAN

1119 MILLER (BS), HUGHES (JW), POMERANZ (Y) and BOOTH (GD). Measuring the breakage susceptibility of soyabean. *Cereal Food World.* 26(4); 1981; 174-7

Breakage susceptibilities of commercial soyabeans determined with a model CK2 Stein breakage tester were correlated highly with those obtained with a grain accelerator that simulates operation of a grain elevator. A running time of only 1 minute will differentiate between sound and breakage prone samples. Breakage increased as temperature or moisture content decreased. Breakage susceptibility of 50% of 61 commercial soyabeans can be estimated from the proportions and breakage susceptibilities of the components of the mixture by using a linear relationship. AA

1120 POUR-EL (A), NELSON (SO), PECK (EE), TJHIO (B) and STETSON (LE). Biological properties of VHF - and microwave-heated soyabeans. *J. Food Sci.* 46(3); 1981; 880-5, 895

The biological properties of dielectrically heated (42 and 2450 MH_z) soyabeans depended on the minimum energy absorbed (MEA); this could be calculated from temperature-rise and moisture-loss during treatment. Treatments characterised by MEA values in 200-300 cal/g range reduced trypsin inhibitor (TI), urease and lipoxygenase activities to low levels, while peroxidase activity remained relatively high at the same MEA levels. Protein solubility and dispersibility were rated good indicators of TI activity for dielectrically heated dry soyabeans while urease activity was not. MEA values, and perhaps moisture loss could be adequately indicated that the products of high nutritive value and of novel functional products that could be produced by the dielectric heating process may have encouraging possibilities and thus need further study. MVG

1121 YONG (FM), LEE (KH) and WONG (HA). The production of ethyl acetate by soy yeast *Saccharomyces rouxi* NRRLY - 1096. *J. Food Technol.* 16(2); 1981; 177-84

1122 BOOKWALTER (GN) and KWOLEK (WF). Predicting protein quality of corn-soy-milk blends after nonenzymatic browning. *J. Food Sci.* 46(3); 1981; 711-5

Efforts were made to predict the protein quality of high temperature - exposed corn-soy-milk (CSM) samples after nonenzymatic browning by rapid methods that can be used in field locations in place of PER tests. The methods tested were available lysine and Hunter "L" values and the latter was preferred on the basis of rapidity and precision.. The *Tetrahymena pyriformis* W bioassay was also listed but was found to need further study in view of its inconsistencies. Visual comparison with a standard colour plate could be used for rapid detection of sub-standard CSM. MVG

1123 KIMBALL (ME), HSIEH (DST) and RHA (C). Chymotrypsin hydrolysis of soyabean protein. *J. Agric. Food Chem.* 29(4); 1981; 872-4

Commercial soyabean protein isolates were solubilized by a combination of heat and blending and then hydrolysed by α-chymotrypsin. The specificity

of this enzyme for aromatic amino acids was enhanced by optimizing digestion conditions. The average molecular weight of the soluble digestion products was ~1500. The carboxy-terminal amino acids of the digestion products, determined by carboxypeptidase A digestion, were phenylalanine, tryosine, tryptophan, and leucine, as detected by ascending paper chromatography. Thus, this mixture of commercial proteins at high concentration can be hydrolysed with a high degree of specificity with cleavage after only aromatic amino acids (with only one exception of the nonaromatic amino acid leucine) by using α-chymotrypsin. AA

1124 LAWHON (JT), MANAK (LJ), RHEE (KC), RHEE (KS) and LUSAS (EW). Combining aqueous extraction and membrane isolation techniques to recover protein and oil from soyabeans. *J. Food Sci.* 46(3); 1981; 912-6, 919

Two relatively new protein isolation techniques (the Aqueous Extraction Process and the Membrane Isolation Process) were combined to obtain a single isolation procedure to produce protein and oil food products from undefatted soyabeans. Three lots of soyabeans were processed using aqueous extraction, centrifugation and industrial ultrafiltration membranes to obtain either a full-fat, low-fat or intermediate-fat product and an oil cream. Proximate and amino acid analyses, nitrogen solubility profiles, and storage tests were made on spray-dried products. Mean membrane permeation rates achieved ranged from 20-42.6 gfd. Protein products possessed high nitrogen solubilities below pH 3.5 and above pH 7, and were desirably light in colour. AA

1125 YEE (JJ) and SHIPE (WF). Using enzymatic proteolysis to reduce copper-protein catalysis of lipid oxidation. *J. Food Sci.* 46(3); 1981; 966-7,969

Copper-catalysed oxidation of methyl linoleate was studied in a model emulsion system containing either proteins or their hydrolysates. Experiments were conducted with egg albumin, sodium caseinate, and soy proteins. Both the TBA test and diene conjugation measurements revealed that the prooxidant effects of proteins can be reduced by proteolysis. The evidence indicates that the prooxidant activity of complexes of copper and intact proteins is greater than that of copper and proteolytic products. This reduction of prooxidant activity is another example of how proteolysis can improve the functional properties of proteins. AA

COTTONSEED

1126 CHOI (YR), LUSAS (EW) and RHEE (KC). Succinylation of cottonseed flour: Effect on the functional properties of protein isolates prepared from modified flour. *J. Food Sci.* 46(3); 1981; 954-5

Succinylated cottonseed protein isolates (40% and 54% modification of amino groups of control isolate) were prepared under pilot scale processing conditions. Partial succinylation of cottonseed flour increased the yield of protein isolate in isoelectric precipitation (pH 4.5). The succinylated isolates were more water soluble, less heat-coagulable in water, and lighter in colour as compared to conventional isolates. They also showed improved functional properties including higher oil absorption, emulsion capacity, gel strength, water hydration, water retention, and viscosity. Bulk density was decreased and resulted in fluffy isolates. AA

TUBERS AND VEGETABLES

1127 WATADA (AE) and MASSIE (DR). A compact automatic system for measuring CO_2 and C_2H_4 evolution by harvested horticultural crops. *Hortscience.* 16(1); 1981; 39-41

A compact automatic system was developed for sampling, analysing, calculating, and recording rates of carbon dioxide and ethylene production by up to 54 samples. The system consists of rotary stepping valves, microcomputer with printer, cassette tape recorder, and a gas chromatograph. AA

ONION

1128 RAIMANN (M). Thin-layer chromatographic determination of chlorpropham in onions (*Allium cepa* L.). A contribution to the analysis of herbicide residues. *Nahrung.* 25(1); 1981; 49-52

Chlorpropham is extracted with alcohol from the homogenized sample. The extract is purified by column chromatography using silver-nitrate containing alumina and by acetonitrile hexane distribution. Chlorpropham residues as low as 0.05 mg/kg may be detected and concentrations as low as 0.1 mg/kg can be determined by semiquantitative visual spot comparison. The limit of detection on the thin layer chromatogram lies at 0.1 µg. The mean recovery rate is 87% with a standard deviation of ± 6%. AA

1129 SHARMA (A), PADWAL-DESAI (SR), TEWARI (GM) and BANDYOPADHYAY (C). Factors affecting antifungal activity of onion extractives against aflatoxin-producing fungi. *J. Food Sci.* 46(3); 1981; 741-4

The processing factors, that could affect the inhibitory activity of onion extractives against the spores of *Aspergillus parasiticus* have been evaluated. The lachrymatory factor (thiopropanal-S-oxide) had maximal inhibitory activity. The survival of *A. parasiticus* spores depended upon the inhibitor concentration and the time of exposure of the spores to the onion inhibitors. Germinated spores showed more susceptibility to the inhibitors. The inhibitory effect of onion compounds was lost by heating, freeze-drying, dehydration, aeration and agitation, and prolonged storage. AA

GARLIC

1130 MABROUK (SS) and EL-SHAYEB (NMA). The effects of garlic on mycelial growth and aflatoxin formation by *Aspergillus flavus*. *Chem. Mikrobiol. Technol. Lebensm.* 7(2); 1981; 37-41

Both minced garlic and aqueous garlic extracts were inhibitory to aflatoxin formation at lower concentrations (0.1-0.5 g/100ml), and fungicidal at higher concentrations (5-10 g/100 ml). Higher concentrations of unautoclaved garlic are needed to inhibit both mycelial growth and aflatoxin formation by the two *A. flavus* strains in food substrates than in the rice-powder/corn-steep medium. VR

CARROT

1131 HA (Y-D) and BERGNER (K-G). Thin-layer chromatographical investigations to detect phenylurea and N-phenyl carbamate residues. II. Quantitative analysis in carrots, potatoes and wine. *Dtsch. Lebensmittel-Rundschau.* 77(3); 1981; 102-6 (German)

A thin layer chromatographical method is described to determine N-phenyl carbamate and phenylurea herbicides that can be hydrolysed into anilines. The residues, as is common in practice, are extracted from sample material by means of organic solvents. The extract is then used without any further cleaning for thin layer chromatographic separation. After the residues have been hydrolysed with methanolic KOH at the starting point, the TLC plate is developed and then sprayed with fluorescamine solution (0.1 mg/ml of acetone). The fluorescing spots thus obtained are measured with a TLC spectrophotometer and evaluated by means of a calibration curve (straight line). Average retrieval rates for 1.0 ppm of active substance were between 72.9 and 89.9% in potatoes and carrots, and between 75.8 and 104.0% in wine. For an active substance concentration of 0.5 ppm, they were between 58.8 and 75.5% in potatoes and carrots, and between 59.5 and 98.9% in wine. The figures determined for 0.1 ppm quantitites amounted to between 50 and 60% with very few exceptions, in carrots and potatoes. As for the 0.1 ppm in wine, there was a marked difference between phenylurea derivatives (87.5-94.5%) and N-phenyl carbamates (40.3-53.5%). Linuron and monolinuron residues could be estimated even at the 0.05 ppm level, while estimation of other phenylurea derivatives was not attempted at this level. KMD

PARSNIP

1132 STAHL (E). Variation of myristicin content in cultivated parsnip roots (*Pastinaca sativa* ssp. *sativa* variety *hortensis*). *J. Agric. Food Chem.* 29(4); 1981; 890-92

POTATO

1133 STEINBEISS (CD), DRAUSCHKE (W), STAHR (I) and THON (A). Studies on the use of nonly alcohol as a temporary sprout inhibiting agent in seed potatoes. Part I. Studies on the penetrating power and residue problems, carried out with the aid of carbon-14-labelled nonyl alcohol in the gaseous phase. *Nahrung.* 25(1); 1981; 25-33 (German)

A model experiment has been performed using carbon-14-labelled nonyl alcohol, to study the effects of different ventilation times and different storage temperatures on the deposition of nonyl alcohol on potato tubers as well as the repercussions of the joint storage of treated and untreated tubers. Residue analysis showed a lowering in residues with increasing storage time, but essentially no dependence on the duration of fresh air supply. The ^{14}C-activity was chiefly located in the peels. As compared to potatoes stored at temperatures from +6 to +12 C potatoes stored at +4 C exhibited higher total radioactivity and also higher residual activity in the peels. Movement of active material, due to evaporation, from treated potatoes to untreated potatoes has been demonstrated in case of joint storage in a closed ventilation system. AA

1134 DRAUSCHKE (W), STEINBEISS (CD) and HOHNSTADTER (I). Studies on the use of nonyl alcohol as a temporary sprout-inhibiting agent in seed potatoes. Part II. Macro-autoradiographic studies on seed potatoes treated with carbon-14-labelled nonyl alcohol. *Nahrung.* 25(1); 1981; 35-8 (German)

In a model experiment, macro-autoradiographic studies have been carried out on potatoes treated with carbon-14-labelled nonyl alcohol and stored

under different ventilation and temperature conditions to elucidate the penetrating power and residue problems. The following results were obtained: (i) after a 48-hour application by means of an air-return system, nonyl alcohol was uniformly distributed on the total surface of the potatoes; (ii) the active material applied was for the most part located in the peels; (iii) the continuous increase in radioactivity of treated potatoes stored together with untreated potatoes is indicative of a continuous evaporation of the active material and (iv) the evaluation and assessment of the autoradiographies were in good agreement with radioactivity values determined quantitatively. AA

1135 BERGHOFER (E), HEIN (W), KLAUSHOFER (H), STEYRER (W) and MITTELBACH (F). Enzymatic hydrolysis of heat coagulated potato protein. III. Model for the enzymatic hydrolysis of non-pretreated heat coagulated potato protein by treatment with microbial proteolytic enzymes. *Starch.* 33(1); 1981; 18-22 (German)

Seven different samples of proteolytic enzymes were screened and one selected for experiments to determine a model for the enzymatic hydrolysis of heat coagulated potato protein. The screening parameters were, increase of soluble nitrogen, taste, and functional properties of the hydrolysates. To find out the influence of concentration of enzyme and substrate as well as time of hydrolysis on solubility and degree of proteolysis; the methods of chochran and cox (experimental design) and of Box and Wilson (calculation) were chosen. AA

1136 KAHN (V), GOLDSCHMIDT (S), AMIR (J) and GRANIT (R). Some biochemical properties of soluble and bound potato tuber peroxidase. *J. Food Sci.* 46(3); 1981; 756-64

Soluble and bound potato tuber peroxidase (PTP) formed about 60 and 40% respectively, of the total peroxidase extracted from potato tubers. Soluble PTP contained higher levels of protein and lowest peroxidase activity than the bound PTP, the specific activity of the former being 15-fold lower than that of the latter. The pH curves of both forms were similar with broad optima around 5.0-6.0. Heat stability of both was similar; 50% activity was lost after heating for 5 minutes at 70 C. The isoenzyme profile of equal amounts of activity of the two forms was however, different. Insoluble PTP, protein and carbohydrates were much higher than in bound PTP. Both forms could be partially purified by column chromatography on Sephadex G-75 or Sepharose 6 B. Chromatography on Sephadex 6B resolved soluble PTP into two peaks i.e. are minor (peak 1) and one major (peak II). Bound PTP could be resolved under identical conditions into peak II (80% activity) and peak III (20% activity). Isoperoxides could not be resolved by column chromatography. The molecular weight of peak II of soluble and bound PTP was 45,000 and that of peak III was 30,000. Analysis of the ammonium sulphate fraction (30-90%) or of partially purified enzyme on concanavalin A-Sepharose indicated that the isoenzyme of soluble and bound forms differ in their carbohydrate content and/or composition or in the structure of the carbohydrate units. MVG

1137 MEUSER (F) and KOHLER (F). Membrane filtration of process water of potato and wheat starch plants. *Chem. Mikrobiol. Technol. Lebensm.* 7(2); 1981; 51-61 (German)

Process water of wheat and potato starch plants contains all soluble substances of the raw materials, mostly high polymer carbohydrates and proteins. The dry substances of wheat flour and potatoes are dissolved to 7% or 25% respectively in the process water. Recovery of these materials

seems to be necessary to solve the problem of waste water effluents as well as to increase the economy of the processes. It is recommended to concentrate process water using membrane filtration, combined with evaporation and final drying of the concentrates. Based on pilot plant experiments, the technical problems and economy of the processes are discussed. It is shown that process water of wheat and potato starch plants can be filtered through membranes using tubular modules. AA

1138 CHANDRA (S) and MONDY (NI). Effect of potato virus X on the mineral content of potato tubers. *J. Agric. Food Chem.* 29(4); 1981; 811-4

The effect of infection with potato virus X (PVX) on the mineral content of five potato cultivars was studied. The cultivars, Katahdin and Chippewa, were grown during the first season, and Katahdin, Chippewa, Sebago, Peconic, and Bake King were grown during the second season. Tubers from plants that were infected with PVX were compared for mineral composition with those that were free of the infection. Infection with PVX resulted in a decrease in Ca, Fe, and Cu and an increase in P and Zn as compared with the controls. No significant changes were found in K, Mg, Mn, B, and Al content. Cultivars differed in their response to PVX. However, within cultivars there were consistent trends during each of the 2 years of the study. AA

1139 HOLTHUIS (JJ), KERKHOVEN (PH) and MULDER (J). Possibilities and advantages of vacuum rasp in potato starch industry. *Starch.* 33(1); 1981; 14-7 (German)

During rasping of potatoes, the impact of air causes oxidation and as a consequence undesired discoloration of potato protein and pulp. Therefore, sulphur dioxide or sulphites are usually added during processing. An alternative solution seems to be of rasping of potatoes in an oxygen-free system. The new procedure consists basically of an adequate infeed, a circulation system and a gastight rasp with discharge. The potatoes are fed by a water stream through an U-formed tube and via dewatering grid into the vacuum chamber of the rasp. Due to the difference in atmospheric pressure the mixture flows spontaneously into the rasp casing. The vacuum has a favourable influence on the noise-level of the rasp and on the protein quality also. AA

1140 BUSHWAY (RJ) and PONNAMPALAM (R). α-chaconine and α-solanine content of potato products and their stability during several modes of cooking. *J. Agric. Food Chem.* 29(4); 1981; 814-7

HPLC analysis of several commercial potato products revealed that α-chaconine content varied from 0.04-97.9 mg/100 g. While α-solanine was found to be between 0.04 to 48.0 mg/100g. Recoveries ranged from 98.0-101% for α-chaconine, while it was 93-98% for α-solanine. Frying, baking or microwave cooking or boiling potatoes did not affect stability of glycoalkaloids, except for a slight loss during frying. By TLC studies, α-chaconine and α-solanine were confirmed as major glycoalkaloids of these potato products. BSN

1141 HOLM (P). Physical characteristics of an air classified potato starch. *J. Food Technol.* 16(2); 1981; 101-13

When stored at 20 C, potato starch concentrate (96% starch, dry basis produced by air classification of dried potatoes), was found stable over long periods of a_w between 0.4-0.5. It showed high water binding capacity, which is considered a desirable property for processing. From viscosity studies, it was found that the concentrate is stable towards heat, mechani-

cal shear and moderately acid conditions. Paste viscosities were higher than for potato starch, except for gelatinization peak which revealed restricted swelling of granules. The concentrate exhibited almost similar rates of acid stability and retrogradation and freeze than stability as compared to commercial potato starch. BSN

SWEET POTATO

1142 THOMPSON (DP). Chlorogenic acid and other phenolic compounds in fourteen sweet potato cultivars. *J. Food Sci.* 46(3); 1981; 738-40

Fourteen cultivars of sweet potatoes were analysed qualitatively for their phenolic content at harvest and after storage. The phenolic content of the sweet potato cultivars, Centennial, Jasper, Jewel, LO-323, L3-243, L3-151, L4-62, L4-112, L4-131, NC-702, NC-718, Nc-719, NC-345, and V_2-237, was assayed. The qualitative examination of the sweet potato phenolics resulted in the separation and identification of four isomers of caffeoylquinic acid. A fifth compound, which exhibited phenolic acid characteristics, was separated but could not be identified. AA

1143 WALTER (WM) Jr. and CATIGNANI (GL). Biological quality and composition of sweet potato protein fractions. *J. Agric. Food Chem.* 29(4); 1981; 797-9

The protein from "Jewel" and "Centennial" cultivar sweet potatoes was separated into a white protein fraction (WP) and a chromoplast protein fraction (CP). the fractions from each cultivar were purified by solvent extraction with ethanol, hexane-acetone (1:1), and ethyl ether, respectively. The protein content (Kjeldahl nitrogen x 6.25) of the fractions was as follows: "Jewel" WP, 98.1% "Centennial" WP, 93.1%; "Jewel" CP, 70%; "Centennial" CP, 77.5%. As a result of the preparation procedure, both CP fractions had elevated ash, calcium, and iron levels. The purified protein fractions were incorporated into diets, and the protein efficiency ratio (PER) values were determined by using ANRC reference casein as the control protein. The test animals were weanling male Sprague-Dawley rats. It was found that the PER values from both CP and WP from "Jewel" and "Centennial: were equal to the ANRC reference casein PER value. AA

CABBAGE

1144 YILDIZ (F) and WESTHOFF (D). Associative growth of lactic acid bacteria in cabbage juice. *J. Food Sci.* 46(3); 1981; 962-3

BAMBOO

1145 KOZUKUE (E) and KOZUKUE (N). Lipid content and fatty acid composition in bamboo shoots. *J. Food Sci.* 46(3); 1981; 751-5

Lipids in the tissues of four sections (top to base) of bamboo shoots (*Phyllostachys pubescens*) were studied by TLC. Total lipids (TL) varied from 800 (top) to 380 mg (base)/100 g fresh weight. The ratio of nonpolar lipids (NPL); glycolipids (GL)' phospholipids (PL) was approximately 17:27:56. Palmitic, linoleic and linolenic acids were the main fatty acids of the three lipid classes; however, the composition among these fractions was

remarkably different. The fatty acid composition of the triglycerides, the location and distribution of the individual fatty acids are discussed. MVG

TOMATO

1146 CHIRIFE (J), FONTAN (CF) and BOQUET (R). Correlation of water activity data in whole tomato concentrates. *J. Food Sci.* 46(3); 1981; 947-9

It is shown that water activity (a_w) data in whole tomato concentrates of varying total solids content may be well correlated using a simple equation derived from knowledge of the a_w lowering behaviour of nonelectrolytes. The proposed equation has practical value because it allows a_w prediction in tomato concentrates (in the a_w range of most practical interest) from measurement of the Brix value. AA

1147 GUTHEIL (RA), PRICE (LG) and SWANSON (BG). pH, acidity, and vitamin C content of fresh and canned homegrown Washington tomatoes. *J. Food Prot.* 43(5); 1980; 366-9

1148 STINSON (EE), OSMAN (SF), HEISLER (EG), SICILIANO (J) and BILLS (DD). Mycotoxin production in whole tomatoes, apples, oranges and lemons. *J. Agric. Food Chem.* 29(4); 1981; 790-2

Production of mycotoxins in whole tomatoes, apples, oranges, and lemons infected with *Alternaria*, indigenous to these fruits was demonstrated for the first time. Tenuazonic acid (TeA) was the main mycotoxin produced in *Alternaria*-infected tomatoes from commercial sources. Eleven of nineteen tomatoes contained TeA with concentrations as high as 13.9 mg/100g. Much smaller amounts of alternariol (AOH), alternariol monomethyl ether (AME), and altenuene (ALT) were present, while altertoxin-I (ATX-I) was absent. AOH and AME were the major mycotoxins produced in *Alternaria*-infected apples from commercial sources, with maximum concentrations of 5.8 and 0.23 mg/100 g, respectively. Much smaller concentrations of TeA, ALT, and ATX-I were present. In oranges, the preponderant mycotoxins that were produced were TeA, AME, and AOH with average concentrations of 2.66, 1.31, and 1.15 mg/100 g, respectively. Small amounts of ALT and ATX-I were present in all infected oranges. The production of mycotoxins in inoculated lemons was similar to that in oranges. AA

FRUITS

1149 BENK (E). Further contribution to the knowledge of foreign fruits. *Riechstoffe. Aromen. Kosmet.* 31(7); 1981; 234-5 (German)

In this article, the third in this series, the author describes very briefly, the botanical origin, cultivating regions, appearance, aroma, taste, composition and possibilities of use of eight fruits viz: Durian fruit, tree-strawberries, Taboticaba or tree trunk cherries, imbu or Spanish plums, loganberry, longanfruit, cloud berry, and pepino. VR

1150 WILSON (AM), BUSHWAY (AA) and BUSHWAY (RJ). Residue analysis of isopropyl N-(3-chlorophenyl) carbamate in fruits and vegetables using high-performance liquid chromatography. *J. Agric. Food Chem.* 29(4); 1981; 746-9

The HPLC technique, developed for estimation of residues of isopropyl N-(3-chlorophenyl) carbamate (CIPC) in Monomax potatoes at levels of 0.25-81 ppm consists of extraction of the sample with methanol and clean up of

the extract through an acid alumina column. In addition to potatoes, determinations may also be made from beans, peas and blue berries fortified with 0.25 ppm of CIPC. Average recoveries for all the four commodities ranged between 64-102%. None of the sixteen pesticides examined for interferences with CIPC, could be cochromatographed. The lower limit of recovery was found to be 0.12 ppm. BSN

BLACK ELDER BERRY

1151 BENK (E). Use of the flowers of the black elder berry as food. *Riechstoffe Aromen. Kosmet,* 31(10); 1981; 330

The flowers of the black elder berry are used in food preparations such as elder cakes which are made by dipping elder flowers in pancake dough and then by baking them to gold brown in oil. They are also used in 'elder champagne (wine)'. The most important constituent of elder flowers is the ethereal oil. Besides this, they also contain flavonglycoside, sugar, resins and organic acids (acetic acid, maleic acid). Elder flower distillate and elder flower extract are to be evaluated as essence and basic materials for aromatisation of foods, taking the essence regulation into consideration. VR

STRAWBERRY

1152 HARRIS (JE) and DENNIS (C). Susceptibility of strawberry varieties to breakdown in sulphite by endopolygalacturonase from zygomycete spoilage fungi. *J. Sci. Food Agric.* 32(1); 1981; 87-95

Of the eight strawberry varieties tested, Cambridge Favourite was the softest variety in sulphite and was also the most susceptible to breakdown by pectolytic enzyme of *Rhizopus* and *Mucor* spp. Endopolygalacturonase (endo-PG) from these species were more rapidly inactivated in sulphite liquor in the presence of the fruit of Harvester variety, which consequently showed the greatest resistance to breakdown. Isoelectric focusing indicated that a single major isoenzyme from each strain of *R. sexualis*, *R. stolonifer* and *M. piriformis* persisted in sulphite liquor and was therefore, responsible for breakdown other minor isoenzymes produced by the fungi inactivated within 24 hours of sulphiting. KAR

ORANGE

1153 EVENSEN (KB), BAUSHER (MG) and BIGGS (RH). Wound-induced ethylene production in peel explants of 'Valencia' orange fruit . *Hortscience* 16(1); 1981; 43-4

The effect of wounding and abscission-accelerating compounds on ethylene production in 'Valencia' orange (*Citrus sinensis* (L.) Osb.) was studied using enclosed peel explants. Three peel disks, 10 mm in diameter, produced a maximum of about 5.5 nl hour ethylene during the second day after excision from the fruit. Higher rates of ethylene production were observed in albedo than in flavedo tissue from 30 to 72 hours after excision. Treatment with the abscission accelerant 5-chloro-3-methyl-4-nitro-1H-pyrazole (Release) more than doubled ethylene production, an effect which was prevented by cordycepin. Inhibition of ethylene production by rhizobitoxine and cycloheximide indicated that ethylene production induced by either physical

or chemical wounding in citrus peel proceeds from methionine and has requirements similar to those of other tissues. AA

TANGERINE

1154 NAGY (S) and WARDOWSKI (WF). Diphenyl absorption by honey tangerines: The effects of washing and waxing and time and temperature of storage. *J. Agric. Food Chem.* 29(4); 1981; 760-3

Honey tangerines (known earlier as Murcott) a citrus fruit (closely related to orange) were washed and on waxing and storage at 4° and 21 C, for 4 weeks were found to have absorbed 20-25 and 50 - 65 ppm of dipehnyl respectively, when packed with one diphenyl pad. However, when two diphenyl pads were used, the absorption rates increased to 25-35 and 70-85 ppm respectively. The unwashed fruits under similar storage absorbed 10-15 and 45-60 ppm with two diphenyl pads. The mean diphenyl contents of fruits stored at 21 C with two phenyl pads were below the prescribed level of tolerance limit (110 ppm) by USA, but not always below the European and Japanese limit of 70 ppm. BSN

MANGO

1155 MANJEET KAUR and MANJARI CHAUDHARY. L-ascorbic acid contents of mango fruits infected with *Sclerotium rolfsii* and *Collectotrichum falcatum*. *Sci. Cult.* 47(10); 1981; 364-5

Effect of common rotting-fungi (i) *Scleortium rolfsii* and (ii) *Collectotrichum falcatum*) on the ascorbic acid content of Neelam variety mangoes was studied. Healthy fruits were inoculated with (i) or (ii) and the tissues from inoculated region and healthy region were analysed for ascorbic acid after incubation for 3,6 and 10 days. A progressive decrease in the ascorbic acid content with the increase in incubation period in both healthy and infected fruit portions was observed; the decrease, however, was much faster in infected parts. Ascorbic acid reduction was drastic from infection with (i) (73.1%) as compared to (ii) (58.7%). The rapid decline in ascorbic acid may be attributed to the presence of some ascorbic acid degenerating enzymes either in the pathogen or which are formed by the activity of the host. MVG

PEACH

1156 HEATON (EK). Effect of pretreatment on quality of sweet peach pickles. *J. Food Sci.* 46(3); 1981; 906-8, 911

APPLE

1157 RAMASWAMY (HS) and TUNG (MA). Thermophysical properties of apples in relation to freezing. *J. Food Sci.* 46(3); 1981; 724-8

The data (mean values) for the different thermophysical properties in the frozen and unfrozen states for the two varieties of apple (Golden delicious and Granny Smith) have been presented. MVG

1158 BINKLEY (CR) and WILEY (RC). Chemical and physical treatment effects on solid-liquid extraction of apple tissue. *J. Food Sci.* 46(3); 1981; 729-32

Effect of selected chemical and physical treatments on diffusion rates in apple tissue were investigated. Vacuum impregnation of enzymatic and chemical solutions had a positive effect on accelerating the rate of diffusion in the tissues. Pretreatment with radio-frequency energy caused the greatest overall effect on increasing the rate of diffusion. Several pretreatment techniques of possible commercial value have been suggested. MVG

1159 MOYLS (AL). Drying of apple purees. *J. Food Sci.* 46(3); 1981; 939-42

Various factors influencing the drying rate of apple puree were investigated. A heated airstream passed over the puree which was contained on a large flat tray. The drying rate could be increased by raising the air temperature, by increasing the air velocity, by promoting turbulence at the tray entrance, by increasing the vertical spacing between trays, and by using metal instead of wooden trays. Three distinct modes of moisture removal were observed during the transition from wet puree to dried apple leather. It was possible to obtain a suitable apple leather product in about 3 hours using 107 C air at 4.6-7.6 m/sec. AA

SUGAR, STARCH AND CONFECTIONERY

1160 RAO (MA), WALTER (RH) and COOLEY (HJ). Effect of heat treatment on the flow properties of aqueous guar gum and sodium carboxymethylcellulose (CMC) solutions. *J. Food Sci.* 46(3); 1981; 896-99, 902

Apparent viscosities of guar and CMC gums were lost by prolonged heat treatment. The consistency index decreased and flow behaviour increased with heat treatment, the latter indicating that the solution became less shear-thinning (pseudoplastic). D and z values could express the rate of loss of consistency of the solution and the influence of temperature on the rate, respectively. Heat treatment resulted in lower magnitudes of intrinsic viscosity and interaction coefficient was indicated by the dilute solution viscosity. MVG

1161 D'SOUZA (SF) and NADKARNI (GB). Continuous conversion of sucrose to fructose and gluconic acid by immobilized yeast cell multienzyme complex. *Biotechnol. Bioeng.* 22(10); 1980; 2179-89

1162 PARRISH (FW), TALLEY (FB) and PHILLIPS (JG). Sweetness of α-, β-, and equilibrium lactose relative to sucrose. *J. Food Sci.* 46(3); 1981; 933-5

1163 REY (DK) and LABUZA (TP). Characterization of the effect of solutes on the water-binding and gel strength properties of carrageenan. *J. Food Sci.* 46(3); 1981; 786-9, 793

A new procedure using cryoscopic osmometry for the determination of water activity of carrageenan gel systems has been evaluated. MVG

1164 KUGIMIYA (M) and DONOVAN (JW). Calorimetric determination of the amylose content of starches based on formation and melting of the amylose-lysolecithin complex. *J. Food Sci.* 46(3); 1981; 765-70, 777

A new scanning calorimetric method requiring defatting of most starches was used and results compared with those of iodimetric method. The method, which is simpler and faster, induces weighing starch, lysolecithin and water into a hermetic pan and heating it after sealing. The amylose fraction

present in the starch was calculated by dividing the observed enthalpy of the amylose-lysolecithin complex by the enthalpy of melting of pure amylose lysolecithin complex. The method gave unusually high values for amylose for maize and wheat starches and this is still to be exaplined. High amylose content, however, did not present any difficulty if the method was used to compare one variety of starch (maize or wheat) with another. The method gave results with other starches comparable to those obtained by the iodine-binding method. MVG

1165 LEVINE (LW). Sweet yeast goods icing stabilisers and how to use them. *Baker's Dig.* 55(2); 1981; 13-8

BAKERY PRODUCTS

BREAD

1166 BRUMMER (JM) and STEPHAN (H). Gliadin-free breads. *Dtsch. Lebensmittel-Rundschau.* 77(2); 1981; 60-2

Raw material problems that may arise in the manufacture of gliadin-free breads are discussed. Based on consumer needs, manufacturing recommendations are given particularly recipe compilations, which will avoid harmful albumin fractions and will yield a tasty bread of almost ordinary application. Moreover, storage possibilities in households are also indicated. AA

1167 STENVERT (NL), MOSS (R) and MURRAY (L). The role of dry vital wheat gluten in breadmaking. Part I. Quality assessment and mixer interaction. *Baker's Dig.* 55(2); 1981; 6-12

By measuring the farinograph peak development times at two water levels, the quality of five commercial dry vital wheat gluten samples have been evaluated. Both the inherent quality of dough as well as the heat damage that occurred during drying and processing were indicated by the test. The quality assessment is closely related to baking quality, particularly with slow speed mixing where maximum differentiation of gluten quality was obtained. BSN

1168 MAHDI (JG), VARRIANO-MARSTON (E) and HOSENEY (RC). The effect of mixing atmosphere and fat crystal size on dough structure and bread quality. *Baker's Dig.* 55(2); 1981; 28-36

Good quality bread may be prepared from a dough mixed under a vacuum of 28 Hg, in order to avoid fermentation and punching steps during processing. BSN

1169 CHAMBERLAIN (N), COLLINS (TH) and McDERMOTT (EE). Alpha-amylase and bread properties. *J. Food Technol.* 16(2); 1981; 127-52

Increase of α-amylase activity in dough during bread baking results in loss of crumb mechanical strength, increase in amount of starch degradation products, increase in crumb stickiness and problems during slicing of bread. Pilot scale trials have shown that addition of calcium phosphate and extra fat act as ameliorative measures. BSN

1170 REISS (J). The formation of the mycotoxin ochratoxin A by a *Aspergillus ochraceus* in bread. (Mycotoxins in foodstuffs XIV). *Dtsch. Lebensmittel-Rundschau.* 77(1); 1981; 27-32

Three strains of *Aspergillus ochraceus* and one isolate of *Penicillium* were able to grow on different kinds of bread, but only A. *ochraceus* 6514 produced the mycotoxin, ochratoxin A on whole wheat bread, whole wheat bread with wheat germs, and whole wheat bread with linseed. The highest yields, found in whole wheat bread, were in the range of 0.6 to 0.8 µg/g bread. The growth of A. *ochraceus* 6514 and the toxin production was influenced by the "total acid content" (Saure grad) which had to be less than about 8.5; the optimum for the growth was 3.0 and for the toxin formation about 4 to 7. The optimal temperature for growth and mycotoxin production was 20 C. AA

BISCUIT

1171 POVEY (MJW) and HARDEN (CA). An application of the ultrasonic pulse echo technique to the measurement of crispness of biscuits. *J. Food Technol.* 16(2); 1981; 165-75

An encouraging relationship between crispness of biscuits (from sensory measurement) and the velocity of longitudinal sound from an ultrasonic pulse echo technique was observed. However, a less convincing relationship was found between crispness and ultrasonic attenuation. It was observed that ultrasonic velocity showed a better correlation with crispness than the ultrasonically derived young's modulus. BSN

COOKIE

1172 AICHELE (WJ). Cookie and cracker processing. *Cereal Food World.* 26(4): 1981; 161-5

Raw materials needed, packaging materials used, production, processing and energy requirements are the aspects covered. KAR

CAKE

1173 GUY (RCE) and PITHAWALA (AR). Rheological studies of high ratio of cake batters to investigate the mechanism of improvement of flours by chlorination or heat treatment. *J. Food Technol.* 16(2); 1981; 153-66

PASTA

1174 BANASIK (OJ). Pasta processing. *Cereal Food World.* 26(4); 1981; 166-9

Raw materials like wheat, water, eggs and other ingredients and production processes like mixing, extruding, drying and packaging are the aspects covered. KAR

MILK AND DAIRY PRODUCTS

MILK

1175 GRAPPIN (R), PACKARD (VS) and GINN (RE). Repeatability and accuracy of dye-binding and infra-red methods for analyzing protein and other milk compounds. *J. Food Prot.* 43(5); 1980; 374-5,380

1176 MEHTA (RS) and BASSETTE (R). Effects of carton material and storage temperature on the flavour of UHT-sterilised milk. *J. Food Prot.* 43(5); 1980; 392-4

1177 MOSELEY (WK). Pinpointing post-pasteurisation contamination. *J. Food Prot.* 43(5); 1980; 414

Post-pasteurisation recontamination is the main factor in determining shelf-life. The chief source of such contamination is a neglected filler, which can be readily pinpointed by holding a sample from each filler each day at 7 C (45 F) for 7 days before plating. AA

1178 HORAK (FP) and KESSLER (HG). The destruction of meso- and thermophilic spores in UHT milk and UHT-cream processing. *Chem. Mikrobiol. Technol. Lebensm.* 7(2); 1981; 42-50 (German)

The degree of the destruction of microorganisms is of great importance for the bacteriological keeping quality of sterilised and UHT treated milk. The destruction of mesophilic spores (incubated at 30 C) and thermophilic spores (incubated at 55 C) was investigated at temperatures ranging from 104 to 150 C and holding times of 2 to 2000 S. The measurements carried out with a directly operating UHT plant gave the following data:

Spores of a usual whole milk flora.
mesophilic $D_{121\ C}$ = 11S; Z = 10.4 C
thermophilic $D_{121\ C}$ = 25S; Z = 10.4 C
Spores of a usual cream flora
mesophilic $D_{121\ C}$ = 31S; Z = 10.6 C
thermophilic $D_{121\ C}$ = 46S; Z = 10.6 C

Considering the laws of reaction kinetics, indirect UHT-processes can be described by these data too. Thereby, it is possible to compare direct with an indirect UHT treatment regarding destruction of spores. AA

1179 JASJIT SINGH, KHANNA (A) and CHANDER (H). Effect of incubation temperature and heat treatments of milk from cow and buffalo on acid and flavour production by *Streptococcus thermophilus* and *Lactobacillus bulgaricus*. *J. Food Prot.* 43(5); 1980; 399-400

Variations in production of acid and acetaldehyde and proteolytic activity by pure and mixed cultures of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* in response to incubation temperature were determined using cow and buffalo milk. *S. thermophilus* and the mixed culture produced more acid and acetaldehyde at 37 than at 42 C, while the reverse was true for *L. bulgaricus* in both types of milk. The largest amount of acid was produced by *S. thermophilus* in both types of milks heated at 65 C for 30 minutes while *L. bulgaricus* produced the maximum amount of acid in milks heated at 85 C for 10 minutes. In the mixed culture, increased acid and acetaldehyde production were noted in milk sample steamed for 30 minutes. AA

1180 SINGH (RS) and RANGANATHAN (B). Heat resistance of *Escherichia coli* in cow and buffalo milk. *J. Food Prot.* 43(5); 1980; 376-80

Three *Escherichia coli* cultures (0111:B4, 0127:B8 and NP) were selected to study their heat-resistant characteristics when in cow skim, cow whole and buffalo whole milk. The temperatures of heat-treatment included in this study were 50, 55, 60 and 63 C. The time interval during heat-treatment was 10 minutes at 50 and 55 C and 5 minutes at 60 and 63 C. Marked differences in heat-resistance were observed in the three *E. coli* cultures. The z-values obtained for strain 0111:B4 were 8.3, 9.0 and 10.2 when tested in cow skim milk, cow whole milk and buffalo milk, respectively. The z-values for 0127:B8 and NP were 17.5, 18.0 and 19.2 and 18.8, 19.0 and 20.3, respectively, for the three types of milk. AA

1181 YUN (S-E), OHMIYA (K), KOBAYASHI (T) and SHIMIZU (S). Increase in curd tension of milk coagulum prepared with immobilized proteases. *J. Food Sci.* 46(3); 1981; 705-7

1182 VILIM (A), LAROCQUE (L) and MACINTOSH (A). Depletion of brilliant blue F.C.F., penicillin G and dihydrostreptomycin in milk from treated cows with experimentally induced mastitis. *J. Food Prot.* 43(5); 1980; 356-9

1183 POELMA (PL), ANDREWS (WH) and WILSON (CR). Comparison of methods for the isolation of *Salmonella* species from lactic casein. *J. Food Sci.* 46(3); 1981; 804-9

1184 CLEMENS (RA) and MERCURIO (KC). Effects of processing on the bioavailability and chemistry of iron powders in a liquid milk-based product. *J. Food Sci.* 46(3); 1981; 930-2, 935

Relative biological values (RBV) of FDA approved iron powders (carbonyl iron (CI), electrolytic iron (EI) and ferric orthophosphate (FOP) were determined in a canned cocoa-containing milk product before and after retort processing. RBVs for the two elemental iron sources were significantly higher than that for FOP. RBV of EI and CI was significantly increased by processing while that of FOP remained unchanged. In processed products containing elemental powder, 60% of the iron was in the ferrous state while < 0.1% of the iron from FOP was Fe^{++}. MVG

1185 SINGH (RS), SUKHBIR SINGH, BATISH (VK) and RANGANATHAN (B). Bacteriological quality milk foods. *J. Food Prot.* 43(5); 1980; 340-2

Ten samples of baby foods comprising seven brands of infant milk foods and three brands of milk-cereal weaning foods were examined for incidence of different types of microorganisms. One brand of infant milk food with 91 x 10^2 organisms also exhibited the maximum number of staphylococci and some of these were coagulase positive. Some staphylococcal isolates showed thermostable deoxyribonuclease (DN-ase) activity and also produced enterotoxins A or B. One sample of weaning food showed high counts of *Bacillus cereus*. In one of the reconstituted baby food samples when held at ambient temperature (37.5 C), the *Staphylococcus aureus* and *B. cereus* counts increased 10-fold in 3 hours. AA

CHEESE

1186 JASSEN-ESCUDERO (C) and RODRIGUEZ-AMAYA (DB). Composition of the Brazilian cheese "Requeijao do Norte". *J. Food Sci.* 46(3); 1981; 917-9

1187 KOSIKOWSKI (FV). Cheddar cheese from water reconstituted retentates. *J. Dairy Sci.* 63(12); 1980; 1975-80

Ripened cheese prepared from reconstituted creamed retentates of ultrafiltration by cheddar manufacturing principles, initially resembled normal cheddar cheese. However, during ripening they got transformed into Gouda-Swiss type cheese with pH increasing rapidly from 5.2-6.0. Efficiency of cheese yield was 1.21 to 1.32 kg/cheese per kg total solids. Soluble protein in 2-month old, cheese held at 10 C was lower in cheese from retentates of high solids. BSN

1188 SALJI (JP) and KROGER (M). Effect of using frozen concentrated direct-to-the-vat-culture on the yield and quality of cheddar cheese. *J. Food Sci.* 46(3); 1981; 920-4

Approximately 53,000 liters (14,000 gal.) pasteurised whole milk was used to make 16 batches of cheese, eight control batches using conventional bulk starter and eight batches using a frozen concentrated direct-to-the-vat culture. The calculated yields were based on both the weight of milk and cheese, and on the weight of milk solids and cheese solids. The yields averaged, respectively, 9.517% and 48.608% with the bulk starter and 9.707% and 49.191% with the frozen concentrated culture. These differences, slightly favouring the frozen concentrated direct-to-the-vat culture, can be of economic and commercial significance. The compositions of the cheeses made with the two starter cultures were very similar. Sensory evaluation did not reveal significant differences in flavour and texture of the two types of cheese when examined at 3,6,9 and 12 months. AA

1189 MEHTA (R), SHARMA (HS), MARSHALL (JT) and BASSETTE (R). Flavour and texture of cottage cheese made by direct-acid-set and culture methods. *J. Food Prot.* 43(5); 1980; 390-1

Consumers were asked to indicate a flavour and texture preference for one of two creamed and salted small-curd cottage cheeses made by direct-acid-set or conventional short-set culture methods. When a commercial starter distillate flavour was added to direct-acid-set cheese, its flavour and texture were preferred over cheese made by the culture method. Conversely, when flavour was not added to the direct-acid-set cheese, consumers preferred the flavour and texture of the cultured product. Differences among mean flavour or texture scores of three age groups were not significant (<20,20-40, >40). Preferences for texture appeared to be biased by flavour. AA

1190 DEODHAR (AD) and DUGGAL (K). Nutritional evaluation of cheese spread powder. *J. Food Sci.* 46(3); 1981; 925-6, 929

A study on the nutritional evaluation of processed cheddar cheese and cheese spread powder made from it, was undertaken. Levels of all constituents, except phosphorus and moisture contents, were significantly higher in cheese spray-dried powder as compared to processed cheese. Biological evaluation of the products showed that a Modified Protein Efficiency Ratio (PER_D), Net Protein Utilization (NPU), and Digestibility Coefficient (DC) and also regeneration of certain organs, in protein depleted albino rats fed diets based on processed cheese and spray-dried powder made from it, were identical. AA

1191 KAUTTER (DA), LYNT (RK), LILLY (T) JR. and SOLOMON (HM). Evaluation of the botulism hazard from imitation cheeses. *J. Food Sci.* 46(3); 1981; 749-50, 764

1192 RICHARDSON (GH), HONG (GL) and ERNSTROM (CA). Defined single strains of lactic streptococci in bulk culture for cheddar and monterey cheese manufacture. *J. Dairy Sci.* 63(12); 1980; 1981-6

1193 KIRCHHUBEL (W). Investigations on the presence of temperate N-streptococci phages in cheese whey. *Nahrung.* 25(1); 1981; 83-90 (German)

52 strains of *N. streptococci* from 7 whey samples were investigated to detect temperate phages with a method specially developed for this purpose, and they were found in all whey samples and 44 strains. The sensitivity of strains against temperate phages of the same sample to a degree of 73% was unexpectedly high. The relatively small number of manufacturing troubles in the dairy practice is discussed. Since the temperate phages have a permanent tendency to get lysogenized, it is difficult to enrich and pre serve them. AA

1194 GLATZ (BA) and BRUDVIG (SA). Survey of commercially available cheese for enterotoxigenic *Escherichia coli*. *J. Food Prot.* 43(5); 1980; 395-8

CHAKKA

1195 RAMANJANEYULU (G) and LAXMINARAYANA (H). Study of the growth of lactic acid bacteria in chakka. *Curr. Res.* 10(2); 1981; 29-31

MEAT AND POULTRY

1196 SCHWEID (JM) and TOLEDO (RT). Changes in physical properties of meat batters during heating. *J. Food Sci.* 46(3); 1981; 850-5, 859

1197 TSAI (TC) and OCKERMAN (HW). Water binding measurement of meat. *J. Food Sci.* 46(3); 1981; 697-701, 707

A quick technique for measuring cooking yield based on microwave heating was compared with a modified cooked-centrifuge technique for determining water holding capacity and both were compared with the standard raw-press technique for determining water holding capacity. In general the results of the three methods were highly correlated; however, limitations of each method were noted. The effects of additives such as salt, phosphate and binders were evaluated along with the effects of time postmortem and freezing-thawing. The influence of fat was also evaluated and a variety of sausage raw materials were analysed by the three techniques. AA

1198 THEILER (RF), ASPELUND (TG), SATO (K), and MILLER (AF). Model system studies on N-nitrosamine formation in cured meats: The effect of slice thickness. *J. Food Sci.* 46(3); 1981; 691-3

Effect of slice thickness and frying time on nitrosopyrrolidine (NPyr) was investigated in a model bacon system. Higher NPyr levels were obtained by short frying (3 minutes/side) and longer frying (5 minutes/side) in thinner slices and thicker slices respectively. There was an integral relationship between level of N-nitrosamine formation and slice thickness and frying time. This could be explained by considering the rate of N-nitrosamine formation and the rate of its volatilisation. MVG

1199 HAMM (R). Phosphates in processed-meat products - a correction. *Dtsch. Lebensmittel-Rundschau.* 77(1); 1981; 37 (German)

In this paper on "phosphates in meat products", which appeared in the earlier issue (vol 76; 1980; page 263), the author might have given the impression that $Na_3HP_2O_7$ does not exist as a pure salt and that mixtures of $Na_4P_2O_7$ and $Na_2H_2P_2O_7$ have to be used instead. But this is not the case. As per meat legislation such a mixture of the disodium and tetrasodium salt is not permitted, although the pH value of the solution of the mixture may not exceed 7.3. It is feared that use of such mixtures could give rise to pH values, which deviate strongly from the neutral point, and therefore can cause undesired irreversible changes in meat and fat of the roast meat products. Trisodium monohydrogendiphosphate can now be produced industrially by two methods; one of them involves treatment of a mixture of the disodium and tetrasodium salts with just enough water to form the hydrates of the trisodium salt. KMD

1200 SUYAMA (K), ARAKAWA (T) and ADACHI (S). Free fatty aldehydes and their aldol condensation products in heated meat. *J. Agric. Food Chem.* 29(4); 1981; 875-8

The production of α,β-unsaturated aldehydes (α,β-USA) in heated meat has been shown to be due to a series of reactions, starting with hydrolysis of plasmalogen to free fatty aldehydes thus formed may occur by catalysis by amino groups of meat constituents to give α,β-USA. The percentage compositions of the fatty aldehydes and α,β-USA in heated (110 for 30 minutes) beef, pork, and chicken meats were determined by GC. α,β-USA were regenerated from their DNPH derivatives by titanium trichloride and charged on GC. Free state C_{12}-C_{18} aldehydes were present in all the heated meats. The percentage compositions of these fatty aldehydes were the same as the percentage compositions of plasmalogen-bound aldehydes. Hexadecanal (47.2-65.3%) and octadecanal (14.0-29.8%) were the most predominant fatty aldehydes, and 2-tetradecyloctadec-2-enal (35.4-46.3%) was the predominant α,β-USA. AA

1201 BRADSHAW (JG), PEELER (JT) and TWEDT (RM). Thermal inactivation of *Clostridium botulinum* toxin types F and G in buffer and in beef and mushroom patties. *J. Food Sci.* 46(3); 1981; 688-90, 696

The toxins were diluted to give 7700-32000 mouse LD_{50} units/0.5 ml in 0.1 M acetate buffer (pH 5.0), in 0.1M phosphate buffer (pH 6.05), and in beef and mushroom patties (pH 6.05) and heated at 65.6-76.7 C. In beef patties, inactivation times for toxin types F and G ranged from 108.1-1.6 minutes and 158.8-1.8 minutes respectively. In phosphate buffer less time was required. MVG

1202 RAY (FK), MILLER (BG), VAN SICKLE (DC), ABERLE (ED), FORREST (JC) and JUDGE (MD). Microstructure of liver sausage. *J. Food Sci.* 46(3); 1981; 694-6

Study of the freeze fractured cooked liver sausage by scanning electron microscopy demonstrated that the structure of the sausage included both on oil in water emulsion with protein as emulsifier as well as dense layers of protein or protein-fat colloidal complexes. MVG

1203 URAM (G), CARPENTER (JA) and REAGAN (JO). Effects of particle size, casing diameter, and addition of emulsions and residual nitrite on quality attributes of cooked salami. *J. Food Sci.* 46(3); 1981; 842-4

1204 TERRELL (RN), SWASDEE (RL), WAN (PJ) and LUSAS (EW). Cottonseed proteins in frankfurters: Effect on pH, cured colour, and sensory and physical properties. *J. Food Sci.* 46(3); 1981; 845-9

The effects of replacing meat with cottonseed proteins (5,10 or 15%) (genetically glandless cottonseed flour (CF), liquid cyclone processed cottonseed flour (LCPC) and genetically glandless cottonseed storage protein isolate (CI) on pH, subjective and objective colour measurements, palatability scores and Instron textural measurements of Frankfurter-type sausages were investigated. Frankfurters containing increased levels of cottonseed proteins had higher pH, less cured colour, less firmness of skin, softer texture and were less desirable by sensory panels. At 10% or 15% of LCPC levels of cottonseed protein, there were significantly ($P < 0.05$) lower scores for external and internal visual colour, overall satisfaction and bioyield and rupture than with CI. Results also showed that significantly ($P < 0.05$) correlated responses existed within and across replacement levels between pH and sensory panel scores, Instron values and visual colour scores. MVG

1205 PARIZEK (EA), RAMSEY (CB), GALYEAN (RD) and TATUM (JD). Sensory properties and cooking losses of beef/pork hamburger patties. *J. Food Sci.* 46(3); 1981; 860-2, 867

BEEF

1206 KANG (CK), DONNELLY (TH), JODLOWSKI (RF) and WARNER(WD). Partial purification and characterization of a neutral protease from bovine skeletal muscle. *J. Food Sci.* 46(3); 1981; 702-4, 707

1207 CALKINS (CR), DUTSON (TR), SMITH (GC), CARPENTER (ZL) and DAVIS (GW). Relationship of fiber type composition to marbling and tenderness of bovine muscle. *J. Food Sci.* 46(3); 1981; 708-10, 715

1208 CURRIE (RW), JORDAN (R) and WOLFE (FH). Changes in water structure in postmortem muscle, as determined by NMR T_1 values. *J. Food Sci.* 46(3); 1981; 822-3

Longitudinal relaxation times (T_1) have been used to assess changes in muscle water as rigor developed in both rat and beef muscle. A significant correlation between the initial rise in T_1 and the slope calculated from T_1 values measured post rigor was observed. Changes in T_1 and thus water structure seem to be very sensitive to pre rigor events such as pH fall. AA

1209 BERRY (BW), MARSHALL (WH) and KOCH (EJ). Cooking and chemical properties of raw and pre-cooked flaked and ground beef patties cooked from the frozen state. *J. Food Sci.* 46(3); 1981; 856-9

1210 LEE (KN), HO (C-T), GIORLANDO (CS), PETERSON (RJ) and CHANG (SS). Methyl 3,4-dimethyl-5,6-dihydro-α-pyran-6-carboxylate in roast beef volatiles; Identification and synthesis. *J. Agric. Food Chem.* 29(4); 1981; 834-6

Methyl 3,4-dimethyl-5,6-dihydro-α-pyran-6-carboxylate was identified as a compound in the volatiles isolated from roast beef. This compound was synthesized by Diels-Alder reaction between methyl glyoxylate and 2,3-dimethyl-1,3-butadiene. The structure of the synthesized compound was established by infrared, nuclear magnetic resonance, and mass spectroscopy. The identification of this compound in the volatiles of roast beef was confirmed by comparing the mass spectrum with that of the authentic sample. AA

1211 MOLEERATANOND (W), ASHBY (BH), KRAMER (A), BERRY (BW) and LEE (W). Effect of di-thermal storage regime on quality and nutritional changes and energy consumption of frozen boxed beef. *J. Food Sci.* 46(3); 1981; 829-33, 837

1212 WANISKA (RD), SHETTY (JK) and KINSELLA (JE). Protein-stabilised emulsions: Effects of modification on the emulsifying activity of bovine serum albumin in a model system. *J. Agric. Food Chem.* 29(4); 1981; 826-31

A series of laboratory blenders and homogenizers were compared for their capacity to make protein-stabilised emulsions. A Janke-Kunkel blen-

der consistently gave the best emulsions. By use of optimum protein concentrations (0.5%) and temperature (15 C), the effects of modification on the emulsifying activity (EA) of bovine serum albumin (BSA) over the pH range 2-10 were studied. Reduction of the disulphide bonds reduced the EA, urea (8 M)-eliminated EA, while succinylation significantly enhanced the EA of BSA in the pH range 4-7. These studies indicated the importance of protein structure and charge on emulsifying properties. BSA had superior EA to soy proteins, arachin, β-casein, ovalbumin, and β-lactoglobulin. AA

1213 REAGAN (JO), PIRKLE (SL), CAMPION (DR) and CARPENTER (JA). Processing, microbial and sensory characteristics of cooler and freezer stored hot-boned beef. *J. Food Sci.* 46(3); 1981; 838-41, 849

1214 WEISSLER (NL), MANGINO (ME), HARPER (WJ) and RAMAN (R). Identification of serum albumin in protein complexes resistant to dissociation by sodium dodecyl sulphate. *J. Food Sci.* 46(3); 1981; 979-80

Bovine serum albumin has been identified by specific antibody in complexes resistant to dissociation by sodium dodecyl sulphate. Serum albumin containing aggregates were first separated from other proteins by electrophoresis in a sodium dodecyl sulphate gel system and then reacted with specific antibody by electroimmuno-diffusion on cellulose acetate plates. The antibody retained its ability to recognise serum albumin after the complexes had been exposed to detergent and electrophoresis. The procedure is rapid and complexes can be visualized within 2 hours of the completion of the gel electrophoretic run. AA

1215 RASEKH (J) and SLAVICS (J). The U.S. recommends ground beef freezing standards, quality maintenance. *Quick Frozen Food.* 43(7); 1981; 42-7

PORK

1216 THOMAS (MH), ATWOOD (BM), WIERBICKI (E) and TAUB (IA). Effect of radiation and conventional processing on the thiamin content of pork. *J. Food Sci.* 46(3); 1981; 824-8

Ground pork was thermally processed in cans or irradiated in pouches after enzyme inactivation. Thiamin content was measured in both cans by thiochrome method. Results show that thiamin retention decreased with irradiation dose and increased with irradiation temperature. Gamma rays (low dose-rate) gave lower retention than electrons (high dose-rate). Conventional thermal processing also caused thiamin loss comparable to or greater than irradiation at effective processing conditions for sterilisation. MVG

1217 SCHIEMANN (DA). Isolation of toxigenic *Yersinia enterocolitica* from retail pork products. *J. Food Prot.* 43(5); 1980; 360-5

POULTRY

1218 GREENBERG (MJ). Characterization of poultry byproduct meal flavour volatiles. *J. Agric. Food Chem.* 29(4); 1981; 831-4

1219 CULVER (FW). Poultry meat inspection. *Environ. Health.* 88(8); 1980; 172-3

CHICKEN

1220 ROLAND (LM), SEIDEMAN (SC), DONNELLY (LS) and QUENZER (NM). Physical and sensory properties of chicken patties made with varying proportions of white and dark spent fowl muscle. *J. Food Sci.* 46(3); 1981; 834-7

1221 GILANI (SH) and MARANO (M). Congenital abnormalities in nickel poisoning in chick embryos. *Arch. Environ. Contam. Toxicol.* 9(1); 1980; 17-22

QUAIL

1222 WESTLAKE (GE), BUNYAN (PJ), MARTIN (AD), STANLEY (PI) and STEED (LC). Organophosphate poisoning. Effects of selected organophosphate pesticide on plasma enzymes and brain esterases of Japanese quail (*Coturnix coturnix japonica*). *J. Agric. Food Chem.* 29(4); 1981; 772-8

1223 WESTLAKE (GE), BUNYAN (PJ), MARTIN (DA), STANLEY (PI) and STEED (LC). Carbamate poisoning. Effects of selected carbamate pesticides on plasma enzymes and brain esterases of Japanese quail (*Coturnix coturnix japonica*). *J. Agric. Food Chem.* 29(4); 1981; 779-85

EGG

1224 KATO (A), OGATA (S), MATSUDOMI (N) and KOBAYASHI (K). A comparative study of aggregated and disaggregated ovomucin during egg white thinning. *J. Agric. Food Chem.* 29(4); 1981; 821-3

A definite amount of aggregated ovomucin, 0.05g/100mL of egg white, remained insoluble during storage of egg white from 20 to 60 days. The sialic acid content in disaggregated ovomucin obtained by gel filtration on Sepharose 4B of the supernatant of stored egg white increased during storage. The ovomucin elution pattern of Sepharose 4B of thinned egg white obtained after a 20-day storage was similar to that of fresh thick white homogenized with barbital buffer, pH 8.6, rather than that of fresh thick white in the presence of 0.01 M mercaptoethanol. These results suggest that noncovalent disaggregation of ovomucin occurs during thinning without disulphide cleavage. AA

1225 PALLADINO (DK), BALL (HR) Jr. and SWAISGOOD (HE). Separation of native and acylated egg white proteins with gel chromatography and DEAE-cellulose ion exchange. *J. Food Sci.* 46(3); 1981; 778-80

Two chromatographic methods to separate the proteins (native and acylated egg white) and study their corresponding structural changes in order to understand the improvement in functional properties brought upon by chemical modification of egg white, have been described. The modified DEAE-cellulose ion method reduces separation time and expense. It was observed that increases in net charge introduced by acylation with succinic or acetic anhydride changed the ionic state of proteins, limiting their separation by column chromatography. The new gel chromatographic method using Sephacryl S-200 separated over 80% of the total succinylated egg white proteins. S-200 chromatography also separated most of the proteins of native and acetylated egg white, but rechromatography of the ovalbumin-conalbumin fractions was necessary for complete resolution. MVG

SEAFOODS

FISH

1226 BELLO (RA), LUFT (JH), and PIGOTT (GM). Improved histological procedure for microscopic demonstration of related changes in fish muscle tissue structure during holding and freezing. *J. Food Sci.* 46(3); 1981; 733-7, 740

1227 KOSAK (PH) and TOLEDO (RT). Brining procedures to produce uniform salt content in fish. *J. Food Sci.* 46(3); 1981; 874-6

The two-stage brining procedure, described, resulted in minimal differences in water phase salt contents between the thin and thick sections of the fish. In the first stage the fish was soaked in 10% NaCl for 15 hours using a fish to brine ratio of 1 lb to 1 L. In the second stage, the soaking was in 2% NaCl for 24-48 hours, depending on the size of the fish to leach out excessive salt in the thin sections while leaving the salt in the thick sections. The procedure gave uniform salt content in different areas of the smoked fish. MVG

1228 PANDURANGA RAO (CC), IMAM KHASIM SAHEB (D), GUPTA (SS), UNNITHAN (GR), CHARI (ST), SRINIVASAN (R), SANTHANRAJ (T) and PILLAI (KVN). Comparative study of traditional and improved containers for transportation of fresh fish. *Fish. Technol.* 18(1); 1981; 29-33

Traditional containers (bamboo basket) of 100 to 150 k capacity, and lined with palmyrah mat and dry leaves spread at the bottom were compared with plywood box insulated with expanded polystyrene for transportation of marine (eels, lesser sardines, Hilsa keeli, Caranx, seer), fresh water (catla, rohu and mrigal) and brackish water fish (*Chanos chanos*) from Kakinada to Madras by rail (700 km in 24 hours). The quality of the fish were assessed at despatching and receiving centres by organoleptic, total volatile N (TVN), total bacterial count (TBC) and coliform counts. All the consignments reached the destination in good conditon and fetched the same price irrespective of the type of container, the cost of the traditional container was however cheaper. MVG

1229 ABE (H). Determination of L-histidine-related compounds in fish muscles using high-performance liquid chromatography. *Bull. Jpn. Soc. Sci. Fish.* 47(1); 1981; 139

1230 LUTEN (JB). An automated fluorimetric method for the determination of histamine in canned fish products. *J. Food Sci.* 46(3); 1981; 958-9

In this procedure, proteins are precipitated prior to automatic extraction and fluorimetric detection by adding trichloroacetic acid and sodium hydroxide followed by centrifugation. Results with samples of commercially canned mackerel, tuna, herring and sardines, using this method, showed that ~79% of the samples had histamine levels less than 1 mg%, while ~ 8% of the samples had a histamine level higher than 10 mg%. MVG

1231 ANAND (CP) and RUDRA SETTY (TM). Studies on the chemical control of psychrophilic bacterial spoilage of fish. II The effect of antibiotics of the growth of psychrophilc bacteria isolated from marine fish. *Fish. Technol.* 18(1); 1981; 41-5

Aureomycin, Terramycin, Tetracycline, Chloramphenicol and chlorostrep, Dihydrostreptomycin and Bacitracin were investigated for their effect on six genera of psychrophilic bacterial cultures isolated from marine fish. Of the above antibiotics tetracyclines particularly chlortetracycline (CTC), chloramphenicol and chlorostrep were fairly effective at 8 and 10 ppm levels. The organisms were sensitive to CTC in the following orders: *Achromobacter* < *Flavobacterium* < *Pseudomonas* < *Micrococcus* < *Vibrio* < *Alcaligenes*. The species of *Achromobacter*, *Flavobacterium* and *Pseudomonas* were more resistant to antibiotics than others. Among the resistant organisms, *Achromobactor superficialis* was the most resistant and was only partially inhibited by CTC at 10 ppm. Different combinations of antibiotics were also studied for their usefulness for commercial application. (For part (i) see Fish. Technol. 14; 1977; 98-102) MVG

1232 ANAND (CP) and RUDRA SETTY (TM). Studies on the chemical control of psychrophilic bacterial spoilage of fish. III. The effect of chemical preservatives on the growth of psychrophilic bacteria isolated from marine fish. *Fish. Technol.* 18(1); 1981; 47-53

13 cultures belonging to *Achromobacter* (4), *Alcaligenes* (2), *Flavobacterium* (2), *Pseudomonas* (2), *Micrococcus* (2) and *Vibrio* (1) sp. were tested for sensitivity against propylhydroxy-4-benzoate (Propyl paraben), methyl-para hydroxybenzoate (methyl paraben), O-chlorobenzoic acid, sodium hypochlorite, polyethylene glycol 400 and 6,9 - diamino-2-ethoxy acridine lactate (ethoidin). Among these propyl and methyl paraben at 0.1 and 0.2% levels respectively were very effectively inhibited the growth of all cultures. O-chlorobenzoic acid (upto 0.2%), sodium hypochlorite (upto 25 ppm), ethoidin (upto 0.025%) and polyethylene glycol (upto 4 ppm) showed no inhibitory effect on the culture. (For part (ii) see *Fish. Technol.* 18(1); 1981; 41-5) MVG

1233 ANAND (CP) and RUDRA SETTY (TM). Studies on the chemical control of psychrophilic bacterial spoilage of fish. IV. The effect of chemical preservatives on the growth of psychrophilic bacteria isolated from marine fish. *Fish. Technol.* 18(1); 1981; 55-7

Dehydroacetic acid at 0.25-1.00% concentration at 0.24 N-1.47N, ammonia, 2-(2-furyl)-3-(5-nitro-2-furyl) acrylamide or Af 2, 5-nitro-2 furfurylidene semicarbazone at 0.05-0.20% level and sodium nitrite at 0.05-0.20% concentration were tried for their effectiveness against cultures of 13 psychrophilic bacteria comprising *Achromobacter* (4), *Alcaligenes* (2), *Flavobacterium* (2), *Pseudomonas* (2), *Micrococcus* (2) and *Vibrio* (1). Growth of all cultures were effectively inhibited by dehydroacetic acid and ammonia at all concentration tested, semicarbazone and AF 2 were fairly effective, the former being more effective than the latter. Sodium nitrite, however, was totally ineffective at the concentration tried. (For part (iii) see *Fish. Technol.* 18(1); 1981; 47-53). MVG

1234 SPEHAR (RL), FIANDT (JT), ANDERSON (RL) and DeFOE (DL). Comparative toxicity of arsenic compounds and their accumulation in invertebrates and fish. *Arch. Environ. Contam. Toxicol.* 9(1); 1980; 53-63

SARADINE

1235 KASAHARA (K) and NISHIBORI (K). Volatile components of smoked sardine. *Bull. Jap. Soc. Sci. Fish.* 47(1); 1981; 113-9 (Japanese)

The volatiles of smoked sardine were compared with those of raw sardine and the non-smoked dried sardine. In organoleptic test, most of the

panel members could not detect the undesirable sardine odour in the smoked sample and preferred the smoked sardine flavour. In GLC and GC-MS analyses, thirty nine volatile components (nine carbonyls, three alcohols, sixteen phenols, two esters and nine hydrocarbons) from the smoked sardine, nine hydrocarbons from raw sardine and eighteen volatiles (eight carbonyls, two alcohols and eight hydrocarbons) from dried sardine were identified. In the smoked sardine, phenolic volatiles were considered to play an important role in masking the undesirable odour of the sardine. KAR

1236 KASAHARA (K) and NISHIBORI (K). Volatile components of rice bran-fermented sardine. *Bull. Jpn. Soc. Sci. Fish.* 47(1); 1981; 121-5 (Japanese)

Volatile components of rice bran-fermented sardine and raw sardine were studied by GLC and GC-MS analysis. Forty components (nine acids, three bases, one phenol, seven carbonyls, five alcohols, seven esters, and eight hydrocarbons) from rice bran fermented sardine and eighteen components (one acid, three bases, one alcohol, one sester and twelve hydrocarbons) from raw sardine were identified. Hydrocarbons and bases in rice bran-fermented sardine seemed to be derived from sardine itself, because these components were detected from raw sardine. But most of the other volatile components of rice bran-fermented sardine were considered to be formed by the fermentation and change of components in sardine meat, and seemed to mask the odour specific of sardine. AA

COD

1237 SLABYJ (BM), MARTIN (RE) and RAMSDELL (GE). Reproducibility of microbiological counts on frozen cod: A collaborative study. *J. Food Sci.* 46(3); 1981; 716-9, 723

TUNA

1238 HUMAN (J) and KHAYAT (A). Quality evaluation of raw tuna by gas chromatography and sensory methods.. *J. Food Sci.* 46(3); 1981; 868-73, 879

An objective method of evaluating raw tuna quality was developed based on the volatile profile pattern obtained by gas chromatography. Five components of the volatile profile showed a significant correlation to the raw tuna quality evaluated organoleptically. A chemical quality index, (QI) was developed on commercially available tuna using the concentration of five components: ethanol, propanol, butanol, hexanal, and 1-pentene-3-ol. Quality designation of raw tuna using the Q.I. index resulted in a more accurate classification than the organoleptic method. AA

CROAKER

1239 TOWNLEY (RR) and LANIER (TC). Effect of early evisceration on the keeping quality of Atlantic croaker (*Micropogon undulatus*) and grey trout (*Cynoscion regalis*) as determined by subjective and objective methodology. *J. Food Sci.* 46(3); 1981; 863-7

SNOEK

1240 THERON (DP) and PRIOR (BA). Effect of water activity and temperature on *Staphylococcus aureus* growth and thermonuclease production in smoked snoek. *J. Food Prot.* 43(5); 1980; 370-3, 80

BLUE WHITING

1241 BARASSI (CA), BOERI (RL), CRUPKIN (M), DAVIDOVICH (LA), GIANNINI (DH), SOULE (CL), TRUCCO (RE) and LUPIN (HM). The storage life of iced southern blue whiting (*Micromesistius australis*). *J. Food Technol.* 16(2); 1981; 185-97

VEAL

1242 SHORLAND (FB), IGENE (JO), PEARSON (AM), THOMAS (JW), McGUFFEY (RK) and ALDRIDGE (AE). Effects of dietary fat and vitamin E on the lipid composition and stability of veal during frozen storage. *J. Agric. Food Chem.* 29(4); 1981; 863-71

PRAWN

1243 CHAUDHURI (DR), BHATTACHARYA (SK) and BOSE (AN). Prediction of drained weight in canned prawn under commercial conditions. *Fish. Technol.* 18(1); 1981; 59-60

A modified general formula to predict the drained weight under commercial conditions of processing has been worked out. It is : Drained weight = (3.8 - (4.507-0.0533B)T-0.125)B where B is the concentration of salt in blanching brine and T is the time of blanching. The prediction of drained weight from the equation is accurate within ± 5%. MVG

SQUID

1244 KONNO (K) and YOSHITOMI (B). Interaction of squid myosin with F-actin in low-salt medium. *Bull. Jpn. Soc. Sci. Fish.* 47(1); 1981; 133-8 (Japanese)

SHRIMP

1245 SRINIVASA GOPAL (TK) and GOVINDAN (TK). Effect of frozen storage on the physical properties of corrugated fibre-board master cartons and waxed duplex cartons. *Fish. Technol.* 18(1); 1981; 35-9

Corrugated fibre-board (CFB) master cartons (unwaxed 5 ply, B flute, 651 gsm)and waxed duplex cartons (DC) used in export of frozen shrimp were investigated for physical deterioration during frozen storage upto 6 months. There was a spurt in moixture uptake with the resultant decrease in physical quality parameter like bursting strength, puncture resistance, tearing strength and tensile in CFB. The % increase in moisture and the fall in bursting strength in DC were less than that of CFB, the most severe change was in fall of the tensile strength of CFB during the 6 month storage period. Both CFB and DC were exposed to moisture for 3 hours and increase

in moisture and the changes in bursting strength, puncture resistance, and tearing strength are given. Both CFB and DC were coated with multiple coatings of wax and their resistance to moisture was also determined. Two wax coatings were found to be sufficient to impart sufficient water resistance to CFB and DC. The wax coated CFB and DC were exposed to water for 3 hours and its effect on bursting strength and puncture resistance were determined. It was concluded that wax coating alone was not a decisive factor in the matter of fluid absorption. Other factors which concurrently influence on resistance against fluid penetration in paper boards include the amount of sizing, sheet density and ash content. MVG

1246 TABLERDS (MA) and YOUNG (RH). Behaviour of the mechanically separated flesh of some common fish species of the Mexican shrimp by catch during storage at -20 C. *J. Food Technol.* 16(2); 1981; 199-212

FROG

1247 GOPALAKRISHNA IYER (TS) and DAMLE (SP). Isolation of *Salmonella iarochelle* for the first time in India. *Fish. Technol.* 18(1); 1981; 63

A new serotype of *Salmonella iarochelle* (6,7: eH: 1,2) has been isolated from froglegs marketed in Bombay intended for domestic consumption. The biochemical properties of the serotype were similar to that of typical *Salmonella*. MVG

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

1248 LLUCH (MA) and FLORS (A). Desulphitation of fruit juices. XII. Calculation of multi-stage flash evaporation processes for grape must in a Y-X equilibrium chart. *Rev. Agroquim. Technol. Aliment.* 19(3); 1979; 355-66 (Spanish)

This paper deals with the construction of a Y-X chart intended for the calculation of multi-stage flash evaporation desulphiting processes for grape musts. This chart, similar to those normally used in other mass-transfer processes, contains, besides the SO_2 grape must equilibrium curve, two different operating lines, representing for each evaporation stage the material balances of either the free and total SO_2 around the flash chamber. A simple bench scale method for obtaining SO_2/grape must equilibrium data is also described. AA

BANANA JUICE

1249 FLORIBETH VIQUEZ, CELSA LASTRETO and COOKE (RD). A study of the production of clarified banana juice using pectinolytic enzymes. *J. Food Technol.* 16(2); 1981; 115-25

Of the six commercial pectinolytic enzyme treatments employed for clarification of ripe banana pulp, for only two of these preparations,

optimal conditions regarding enzyme concentration, incubation temperature, time and pH levels have been reported. Pulp incubated at 45 C for one hour with 0.01% w/w enzyme by subsequent centrifugation at 2900 maximal relative centrifugal force for 20 minutes, yielded 55-60% (based on pulp weight) fruit juice. Hydraulic pressing of the pulps at 16 Kg/cm^2 gave similar yields, although untreated control samples gave less than 5% juice under these conditions. BSN

CITRUS JUICE

1250 ALBACH (RF), REDMAN (GH), CRUSE (RR) and PETERSEN (HD). Seasonal variation of bitterness components, pulp and vitamin C in Texas commercial citrus juices. *J. Agric. Food Chem.* 29(4); 1981; 805-8

The bitter components, naringin (in grapefruit) and limonin (in oranges and grapefruit), were quantitated along with pulp, pH, acid, °Brix, oil, vitamin C (ascorbic acid), and colour in single-strength and reconstituted concentrated juices packed by the major Texas commercial processors over three seasons. By December, for orange, and by March, for grape fruit, no juice contained more than 6 ppm of limonin. The 3-year mean for oranges was 3 ppm of limonin and for grapefruit 7 ppm of limonin and 585 ppm of naringin (by the Davis test). In both juices, limonin concentration decreased rapidly as the season progressed; naringin concentration remained steady until spring when it began to increase. There was found to be no linear correlation between pulp content of either juice and the concentration of the bitter components. Pulp content of orange juice varied considerably and consistently between plants. The three-year means of vitamin C in grapefruit and orange juices were 31.3 and 43.8 mg/100 mL, respectively. AA

GRAPEFRUIT JUICE

1251 ALBACH (RF), REDMAN (GH) and CRUSE (RR). Annual and seasonal changes in naringin concentration of ruby red grapefruit juice. *J. Agric. Food Chem.* 29(4); 1981; 808-11

1252 McCLOSKEY (LP) and MAHANEY (P). An enzymatic assay for acetaldehyde in grape juice and wine. *Am. J. Enol. Vitic.* 32(2); 1981; 159-62

A rapid enzymatic method for the determination of acetaldehyde in juice and wine is presented. The assay measures both acetaldehyde and the bisulphite addition product, 1-hydroxyethane sulphonic acid. The assay utilizes one enzyme and NADH. This assay essentially recovers 100% of the acetaldehyde and the statistical data are good. The standard deviation was less than 1 ppm at a mean of 120 ppm. The assay was applied to both red and white wines and any interferences due to red wine phenolics was overcome with PVP. When applied to table wines, the assay showed an average of 83 ppm for reds and 32 ppm for whites. AA

1253 SPLITTSTOESSER (DF) and MATTICK (LR). The storage life of refrigerated grape juice containing various levels of sulphur dioxide. *Am. J. Enol. Vitic.* 32(2); 1981; 171-3

Shelf life at 5 C was determined for 135 grape juices treated with 0, 100, 200 and 300 ppm SO_2. Of the untreated samples, 85% fermented within five weeks compared to a rate of 13% in 30 weeks in the presence of 100 ppm SO_2. Only three juices treated with 200 ppm SO_2 and two treated with

300 ppm fermented during 30 to 35 weeks of storage. Examination of 13 non-fermented juices treated with 200 ppm SO_2 revealed all to be negative for viable yeasts at the end of this period. The sulphited juices that had fermented had initial yeast populations of 10^6/mL or greater. Settling of juices for 26 hours reduced viable yeast populations by 54 to 96% and thus might be a practical control procedure. The addition of 200 ppm SO_2 appeared to be the optimal treatment since it completely inhibited mold growth and prevented fermentation of most samples. It was concluded that the combination of SO_2 plus a low storage temperature is feasible for the preservation of Eastern grape juice providing that yeast contamination is not excessive. AA

ORANGE

1254 DONER (LW) and BILLS (DD). Stable carbon isotope ratios in orange juice. *J. Agric. Food Chem.* 29(4); 1981; 803-4

By employing isotope ratio and MS ratios of $^{13}C/^{12}C$ in 42 pure orange juice samples have been determined. Thirty one domestic blends, seven samples of varietal purity and four foreign orange juice samples, when examined to establish base-lines for a method to detect undeclared addition of corn or cane sugar to orange juice, showed the mean $\delta^{13}C$ (ppt) value for all samples to be -24.5 (ppt) with the coefficient variation at just 2.41%. Being the smallest variation observed for any orange juice component or physical property, the sensitivity with which adulteration has been done may be detected. BSN

1255 NAGY (S) and ROUSEFF (RL). Lead contents of commercially canned single-strength orange juice stored at various temperatures. *J. Agric. Food Chem.* 29(4); 1981; 889-90

The lead contents of commercially canned single-strength orange juice varied within a narrow region (0.02-0.32 mg/kg of juice). Analysis of 168 samples showed that only four samples exceeded by 0.01-0.02 ppm the stringent tolerance level of 0.3 ppm established by FAO/WHO for canned baby juices. No statistical relationship was observed between storage temperature and lead content with commercial samples. Our data suggest that the variability in the lead contents of commercially canned orange juice was primarily due to the amount of solder (splashings and seepage through the side seam) exposed to the juice. AA

PRUNE JUICE

1256 BOLIN (HR). Rheological properties of prune juice. *J. Food Sci.* 46(3); 1981; 886-8

COCOA

1257 WELCH (RC). Dutched or alkalised cocoa nib process. *Manuf. Confect.* 61(3); 1981; 52-3

1258 McDONALD (CR), LASS (RA) and LOPEZ (ASF). Cocoa drying. A review. *Cocoa Grower's Bull.* No. 31; July 1981; 5-41

Discusses: theory of drying as related to cocoa (heat transfer, dry convective heat transfer, conduction and radiant heat transfer, multistage

drying, interrupted drying); drying and end product quality (storage and mechanical strength requirements, oxidation, off flavour developments, and product conditions); natural drying in the sun; and artificial drying systems (natural convection, Martin drier, samoan drier, secador tubular, infrared drier, sun aided natural convection drier, forced convection drier, platform driers; rotary drier, tunnel drier, solar forced convection driers, conduction driers). BSN

BEER

1259 CASEY (GP) and INGLEDEW (WM). The use and understanding of media used in brewing bacteriology. I. Early history and development of general purpose media. *Brew. Dig.* 56(2); 1981; 26-32

1260 CASEY (GP) and INGLEDEW (WM). The use and understanding of media used in brewing bacteriology. II. Selective media for the isolation of lacti-acid bacteria. *Brew. Dig.* 56(3); 1981; 38-45

1261 DOTY (JW). The falling number method. A rapid technique for malt control. *Baker's Dig.* 55(2); 1981; 23-5

The falling number method is a simple and a highly reproducible method for estimation of α-amylase in flour, irrespective of the fact whether it is added by supplementation at the mill or introduced through a rapid spout. A method is being now developed (based on this procedure) for analysing flour containing fungal α-amylase instead of cereal malt. BSN

WINE

1262 PUECH (J-L). Extraction and evolution of lignin products in Armagnac matured in oak. *Am. J. Enol. Vitic.* 32(2); 1981; 111-4

The lignin content of various French and foreign oaks varies from 25.3 to 28.5%. The inner stave faces of oak barrels that contained Armagnac for 20 years had a lower content than the outer stave faces had. However, the outer faces contained more aromatic aldehydes. The amounts of ligno-complex compounds and degradation products were assessed during aging of Armagnac. Syringaldehyde, vanillin, sinapaldehyde, and coniferaldehyde were identified, and they varied from 1 to 11.4 mg/L in 5 to 30 year old Armagnac. The total amounts of seven aromatic acids (cinnamic, benzoic, syringic, vanillic,ferulic, p-hydroxybenzoic, and p-coumaric) varied from 2.6 to 12.2 mg/L. A lignin degradation mechanism in oak during the aging of spirits is suggested. AA

1263 LOWENBERG (DW), OUGH (CS), LEPKOVSKY (S) and FURUTA (F). The effect of ethanol and wine on the plasma histamine level of chickens and man. *Am. J. Enol. Vitic.* 32(2); 1981; 128-31

1264 KRAUS (JK), SCOPP (R) and CHEN (SL). Effect of rehydration on dry wine yeast activity. *Am. J. Enol. Vitic.* 32(2); 1981; 132-4

The effects of rehydration media and temperature on resulting fermentation activity were studied for nine commercial and experimental active dry wine yeasts. Water and grape juice were used as rehydration media at temperatures from 20 to 45 C. Fermentation activity was measured by gas production from grape juice according to a previously published method. The loss of cell constituents on rehydration was also measured and related

to the physical form of the samples. The optimal rehydration temperature was found to be about 38 to 40 C for all samples in either grape juice or water. The results indicate that although all the active dry wine yeasts may be added directly to must at cellar temperatures, fermentation activity is improved by the specified prior rehydration. The greater loss of cell constituents on low temperature rehydration was suggested as an explanation of the observed activity effects. AA

1265 SCOTT (RS), ANDERS (TG) and HUMS (N). Rapid cold stabilization of wine by filtration. *Am. J. Enol. Vitic.* 32(2); 1981; 138-43

1266 FAGAN (GL), KEPNER (RE) and WEBB (AD). Biosynthesis of certain gamma-substituted-gamma-butyrolactones present in film sherries. *Am. J. Enol. Vitic.* 32(2); 1981; 163-7

Ethyl-4-oxobutyrate-2-^{14}C added to a simulated sherry under an actively growing film of *S. fermentati* yielded radioactive gamma-butyrolactone, diethyl succinate, ethyl 4-oxobutyrate diethyl acetal, an unidentified ester, and 4-hydroxy-5-ketohexanoic acid gamma-lactone, thus confirming the pathways proposed earlier for their formation. When unlabeled ethyl-4-oxobutyrate was used in similar experiments, the same compounds and 4,5-dihydroxyhexanoic acid gamma-lactone had their concentrations enhanced. 4-Hydroxy-5-keto-hexanoic acid gamma-lactone isolated from the latter experiment was optically active (+) and showed a specific rotation vs. wavelength "plain curve". AA

1267 VAN DER WESTHUIZEN (LM), AGENBACH (WA), LOOS (MA) and SCHOOMBEE (NF). Comparison of procedure for isolation of malolactic bacteria from wine. *Am. J. Enol. Vitic.* 32(2); 1981; 168-70

Malolactic bacteria were isolated from wine by direct streaking on modified Rogosa agar plates followed by aerobic incubation or incubation in a high CO_2 atmosphere, or enrichment in modified Rogosa broth before streaking and aerobic incubation (designated aerobic, high CO_2 and enrichment incubations, respectively). The incubation temperature was 30 C throughout. More cocci were isolated with the aerobic and high CO_2 incubations than with the enrichment incubation. Preliminary identification tests indicated that 41 lactobacilli, 34 leuconostocs and 15 peidiococci were isolated by the aerobic and high CO_2 incubations while 45 lactobacilli and only two leuconostocs and one pediococcus were isolated with the enrichment incubation. The high CO_2 incubation seemed the most suitable for the isolation of leuconostocs. AA

1268 MULLER (TH) and WURDIG (G). Mathematical determination of alcohol and extract contents in wines by means of density ratio d 20/20 and refractive index R_D^{20}. *Dtsch. Lebensmittel-Rundschau.* 77(2); 1981; 55-9 (German)

After a critical comparison of all published equations for the mathematical evaluation of the amount of alcohol and total dry extract (E) from specific gravity and refractive index, the authors have computed, by means of linear multiple regression analysis of the data from nearly 300 wines of different origins well adapted polynomials with wide but determined ranges of validity. If the alcoholic strength does not exceed 110-0.47E grams/litre, the range of equation I (alcohol) is 50 to 100 g/l for amounts of total dry extract < 90 g/l and amounts of total alcohol <100 g/l. The range of the extract formula (equation II) is 15 to 160 g/l if the total alcoholic strength does not exceed 135 g/l. In addition, two other polynomials have been computed for the evaluation of alcohol (equation VI) and total dry extract (equation V) in fermenting musts (alcohol content : 2 to 50 g/l). AA

1269 BURKHARDT (R). Quantitative determination of 5-nitrofuryl 2-acrylic acid in white and red wines Part II. *Dtsch. Lebensmittel-Rundschau.* 77(3); 1981; 97-8 (German)

5-NFA is shaken out of wines through an extracting enrichment with n-butanol whereas the white wine extract can be taken up for photo electrical estimation without any further handling, the n-butanolic phase in red wines must first be freed, by means of PVPP, from interfering phenolic substances that are also extracted. This step results in a brightening of the colour also. If and when sorbic acid is present together with 5-NFA, polyamide-plate chromatography will permit their detection separately, in each other's presence, and to identify them by means of UV light of wave-length 250 nm and 365 nm, in conjunction with Rf values. The presence of sorbic acid does not interfere with the quantitative determination of 5-NFA in either white or red wines. KMD

1270 WATTS (DA), OUGH (CS) and BROWN (WD). Residual amounts of proteinaceous additives in table wine. *J. Food Sci.* 46(3); 1981; 681-3, 687

OILS AND FATS

1271 SCHEFFER (JJC) and BAERHEIM SVENDSEN (A). Analysis of essential oils. Ten years of essential oil research. *Riechstoff. Aromen. Kosmet.* 31(2); 1981; 39-41 (German)

The authors have reviewed the research work on essential oils done during the last few decades, on the occasion of the Tenth International Meeting on "Occurrence and Analysis of Essential Oils" at Wurzburg, in May 1979. They have made special mention of their own work, and of the procedure being used at present for analysis of essential oils in the Department of Pharmacognosy at the University of Leyden. KMD

1272 SEN (NP) and SEAMAN (S). An investigation into the possible presence of volatile N-nitrosamines in cooking oils, margarine, and butter. *J. Agric. Food Chem.* 29(4); 1981; 787-9

Analysis of thirty eight samples of various vegetable oils, ten samples of butter, fourteen samples of margarine and six samples of lard from retail outlets in Canada for presence of volatile N-nitrosamines, showed that in oils and lard they were absent. Trace levels (0.2-3.8 ppb) of N-nitrosodimethylamine/and or N/nitrosomorpholine were present in one sample of butter and in five margarine samples. Recent studies have, however, showed either negative or negligible amounts of nitrosamine in these products. BSN

PALM OIL

1273 MASON (J) and GINAR (L). Palm oil production keeps pace with world demand. *Food Eng. Int.* 5(6); 1980; 24-7

CANOLA OIL

1274 DeMAN (JM) and EL-SHATTORY (Y). Formation of trans-isomers during hydrogenation of canola oil (Tower). *Chem. Mikrobiol. Technol. Lebensm.* 7(2); 1981; 33-6

Canola oil (Tower) was hydrogenated under selective (200 C, 48 KPa) and non-selective (176 C, 303 KPa) conditions with a number of commercial nickel catalysts and the AOCS standard catalyst. Isolated *trans*-isomer content was determined by IR spectroscopy was *cis*- and *trans*- isomers were determined by GLC on a 5 m column of OV 275. The agreement of total *trans*- isomer contents found with the two methods was excellent. *Trans*-content at approximately equal iodine value was higher for selectively than for nonselectively hydrogenated oil. t-dienes were generally absent, but some of the catalysts used resulted in formation of tt-diene. This appears to be related to the sulphur content of the catalyst. AA

OENANTHE

1275 GEDA (A) and BOKADIA (MM). Composition of the volatile oil of *Oenanthe javanica* Wall. *Riechstoff. Aromen. Kosmet.* 31(1); 1981; 15-6 (German)

The volatile oil of *Oenanthe javanica* (Fam. Umbelliferae), native of the sub-Himalayan region, and growing as a weed on river banks in Madhya Pradesh, was separated by column and thin-layer chromatography. Its components were identified with the help of IR, NMR, and mass spectroscopic data. The major components are α-pinene, dillapiol 1:8-cineol, and caryophyllene oxide, which make up about 78% of the oil; dillapiol make up about 67% of the oil. KMD

SPICES AND CONDIMENTS

1276 OBERDIECK (R). A contribution to the knowledge and analytics of Marjoram (*Majorana hortensis* Moench). *Dtsch. Lebensmittel-Rundschau.* 77(2); 1981; 63-74

The essential oils and oleoresins were extracted from 10 commercial margoram varieties from originating in seven different, European and North African areas. The yields and the chemical and physical constants are given. The qualitative and quantitative chemical composition of the essential oils were determined by means of GLC, IR and mass spectroscopy. For the analytical comparison, 49 components of the gas chromatograms have been chosen. From these 49 recorded components 42 could be identified. 3 components could only be recognized by their chemical group membership. A sensoric comparison between the main components *cis*-sabinenhydrate, *trans*-sabinenhydrate and 4-terpinenol shows that *cis*-sabinenhydrate by itself has a good marjoram-like flavour; but in combination with 4-terpinenol it produces a flavour with a much greater resemblance to marjoram. *Trans*-sabinenhydrate shows hardly any resemblance to a typical marjoram flavour. KMD

SENSORY EVALUATION

1277 HERRMANN (J) and ABD EL SALAM (I). New methods for the evaluation and the analysis of sensory qualities of foodstuffs and for the calculation of their changes Part XIV. On the theory and the determination of the temperature dependence of the vapour pressure and the smell perception

value of aroma substances (vanillin in an aqueous solution) by means of the "subjective olfactometry". *Nahrung.* 25(1); 1981; 11-24

The present study is based on the view that, under certain conditions, the smell perception value depends only upon the stimulating efficiency of a given vapour pressure of an aroma substance. Then one would only need to derive the effect of concentration and the temperature (the reaction medium remaining constant) on the vapour pressure from theoretical, physicochemical principles. The authors used a simplified model to derive a theory which permits to calculation of the effect of the reaction medium on the vapour pressure, and also, by means of the "subjective olfactometry", on the smell perception value. This was experimentally demonstrated by the example of vanillin. Furthermore, the authors have developed a simple analytical technique for determining the evaporation enthalpy of aroma substances in very dilute solutions.

1278 GOLOVNJA (RV), JAKOVLEVA (VN), CESNOKOVA (AE), MATVEEVA (LV) and BORISOV (Ju. A). A method of selecting panel for hedonic assessment of new food products. *Nahrung.* 25(1); 1981; 53-8

The authors have suggested a new method of selecting panels for controlling the quality of artificial flavours and food products. The distinctive feature of the method is that longterm training sessions were excluded. The sensitivity of 102 persons to sour, sweet, salty and bitter tastes was examined. The aggregate results were subjected to cluster analysis in accord with a specially elaborated programme. The selected groups of panel members who did not receive long-term training reflect the sensory preferences of the consumer. AA

FOOD STORAGE

1279 KAMLA PRASAD. Storage and preservation of foodgrains in India. Part I. *Bull. Grain Technol.* 18(1); 1980; 45-64

The aspects covered include: objectives and priorities, availability of storage accommodation, Food Corporation of India, ARDC supported programmes, CAP storage, storage and transportation, quality control and warehousing corporations. BSN

1280 KAMLA PRASAD. Storage and preservation of foodgrains in India. Part II. *Bull. Grain Technol.* 18(2); 1980; 135-58

The aspects covered include, developed and under developed states, rural godowns, cooperatives and the warehousing systems, state level agencies, trade storage, overall availability, coordination, farm level storage, storage and food security and nutrition. (For Part I see *Bull. Grain. Technol.* 18(1); 1980; 45-64). BSN

1281 GUPTA (S), SRIVASTAVA (JL) and VARMA (BK). Studies on the absorption of moisture by different foodgrains at different relative humidities. *Bull. Grain Technol.* 18(2); 1980; 165-7

INFESTATION CONTROL AND PESTICIDES

1282 NAHAR (SC) and GUPTA (SK). A preliminary report on stored grain mites of Bihar. *Bull. Grain Technol.* 18(2); 1980; 130-4

1283 SATYA VIR. Effect of food and temperature on the biology on *Trogoderma granarium* Everts, Khapra beetle (Coleoptera - Dermestidae). *Bull. Grain Technol.* 18(2); 1980; 100-4

1284 SHARMA (SS) and CHAHAL (BS). Effect of initial and constant moisture content of grain on the oviposition of *Sitophilus oryzae* (Linn.) (Coleoptera: Curculionidae) *Bull. Grain Technol.* 18(1); 1980; 17-24

The experiment done with wheat variety Kalyan Sona indicated that an increase in initial moisture content of the grain from 8.5 to 17%, increased the oviposition by *S. oryzae* significantly. However, the number of weevils developed at 8.5 and 11.2 % initial moisture content was more or less the same but an increase from 11.2 to 17 % resulted in enhanced weevil emergence which ultimately is the result of more oviposition. The oviposition of the weevils also increased with an increase in the constant moisture content of the grain (8.5 to 17%) at a constant temperature of 28 ± 1 C, and there was no egg laying at 8.5 % moisture content. Maximum egg laying was observed in 21-day old weevils at 28 ± 1 C and at 15% moisture content. BSN

1285 SINGH (KN) and SRIVASTAVA (PK). Neem seed powder as a protectant against stored grain insect pest. *Bull. Grain Technol.* 18(2); 1980; 127-9

1286 SAXENA (Y) and SHARMA (PP). Studies on food consumption and food preference in *Rattus rattus* L. *Bull. Grain Technol.* 28(1); 1980; 42-4

1287 MOHANA RAO (AMK) and PRAKASH (I). Evaluation of bait bases for the control of the house mouse, *Mus Musculus bacterianus* Blyth. *Bull. Grain Technol.* 18(2); 1980; 111-8

1288 VARMA (BK). Dusters and sprayers. *Bull. Grain Technol.* 18(2); 1980; 159-64

1289 SRIVASTAVA (JL). Pesticide residue in food grains and pest resistance to pesticides. *Bull. Grain Technol.* 18(1); 1980; 65-76

Aspects covered include, residue in grain and grain products after treatment with pesticides, methyl bromide, ethylene dibromide, phosphine, dichloros, malathion, pyrethrins and piperonyl butoxide, pesticide residue in samples of food grains, suggestions to avoid contamination of food grains with pesticides, tolerance limits of pesticides in foodstuffs, pest resistance to pesticides and development of resistance to pesticides in India. AA

1290 PARDINI (RS), HEIDKER (JC), BAKER (TA) and PAYNE (B). Toxicology of various pesticides and their decomposition products on mitochondrial electron transport. *Arch. Environ. Contam. Toxicol.* 9(1); 1980; 87-97

1291 PLASS (R) and LEWERENZ (HJ). The significance and importance of enzymodiagnosis in the framework of toxicological studies of plant protectants pesticides and agents for the biological process control. *Nahrung.* 25(1); 1981; 71-81 (German)

In toxicological experimentation, clinico-chemical and biochemical data are increasingly involved in the comprehensive evaluation of adverse effects of plant protectants, pesticides and agents for the biological process control on the mammalian organism. Blood serum and urine, or organic homogenates from experimental animals, kept under standardized conditions, are chiefly used for enzymodiagnostic analysis. Changes

in enzyme activity, occurring under the influence of the bioactive test substances, must be regarded as indicative of direct effects on the biocatalyst, metabolic changes or impairments of certain organs. AA

BIOCHEMISTRY AND NUTRITION

1292 KREIENBRING (F). Results from a comparative determination of amino acids by different laboratories. *Nahrung.* 25(1); 1981; 1-10 (German)

The present comparative determination of amino acids has been carried out by 7 participants using 9 amino acid analysers on 2 samples (soyabean oil meal and pig faeces). All the amino acid contents obtained were compared with standards found in each laboratory and with a master standards. The analytical results of the participants were in good agreement. Method of hydrolysis had little influence on the results. VR

1293 WIDICUS (WA) and KIRK (JR). Storage stability of α-tocopherol in a dehydrated model food system containing methyl linoleate. *J. Food Sci.* 46(3); 1981; 813-6

1294 REINTON (R) and ROGSTAD (A). Antioxidant activity of tocopherols and ascorbic acid. *J. Food Sci.* 46(3); 1981; 970-1, 973

A study was made of the inhibitory effect of the antioxidants α-tocopherol, γ-tocopherol and ascorbic acid on the lipoxygenase catalysed oxygenation of linoleic acid. Gas chromatography was used to measure unchanged fatty acid after varying incubation periods. The effect of the antioxidants was also determined from the traditional rancidity parameters, peroxide value and thiobarbituric value. AA

1295 DAS (D), DHANOA (J) and COWAN (B). Exclusive breast feeding for six months. An attainable goal for poor communities. *NFI Bull.* April 1982; 3-5

TOXICOLOGY AND HYGIENE

1296 D'AOUST (JY), MAISHMENT (C), BURGENER (DM), CONLEY (DR), LOIT (A), MILLING (M) and PURVIS (U). Detection of *Salmonella* in refrigerated pre-enrichment and enrichment broth cultures. *J. Food Prot.* 43(5); 1980; 343-5

1297 BRYAN (FL), STANDLEY (SR) and HENDERSON (WC). Time-temperature conditions of *Gyros*. *J. Food Prot.* 43(5); 1980; 346-53

1298 KUO (JKS) and SILVERMAN (GJ). Application of enzyme-linked immunosorbent assay for detection of Staphylococcal enterotoxins in food. *J. Food Prot.* 43(5); 1980; 404-7

The enzyme-linked immunospecific assay (ELISA) is equally as sensitive as the radioimmunoassay (RIA) for detecting staphylococcal enterotoxins (SE). The substitution of an enzyme is ELISA for 1-125 in RIA results in a more stable reagent and enables quantitation spectrophotometrically or, with appropriate enzymes. Semi-quantitation by visual estimation. Assay procedures identical in principle to RIA are employed with, of course, the necessity to avoid the presence of enzyme inhibitors. To date, nanogram quantities of SEA. SEB and SEC have been

successfully measured in food extracts. In common with RIA, sensitivity is decreased by the presence of food materials. AA

1299 GREENBERG (NA) and MAHONEY (RR). Rapid purification of β-galactosidase (*Aspergillus niger*) from a commercial preparation. *J. Food Sci.* 46(3); 1981; 684-7

Acetone precipitation, gel filtration and affinity charomatography were used. The purified enzyme had high specific activity, the K_m and V_{max} for o-nitrophenyl β-D-galactopyranoside being 2.02 mM and 345 μmoles/min./mg protein respectively at pH 4.5 and 37 C. The enzyme had a molecular weight of 117,000 with an isoelectric point of 4.9. It appeared to be a glycoprotein with multiple molecular forms. The enzyme could be suitable for immobilisation and hydrolysis of lactose. MVG

1300 ASSANTE (G), CAMARDA (L), LOCCI (R), MERLINI (L), NASINI (G) and PAPADOPOULOS (E). Isolation and structure of red pigments from *Aspergillus flavus* and related species, grown on a differential medium. *J. Agric. Food Chem.* 29(4); 1981; 785-7

1301 BUCHANAN (RL) and SHEPHERD (AJ). Inhibition of *Aspergillus parasiticus* by thymol. *J. Food Sci.* 46(3); 1981; 976-7

Thymol concentrations ≥ 500 μg/ml completely inhibited the growth of *Aspergillus parasiticus*, while lower concentrations of the flavour compound produced either partial or transitory growth inhibition. Aflatoxin production was inhibited to a degree ≤ that of growth. AA

1302 DUTTON (MF) and ANDERSON (MS). Inhibition of aflatoxin biosynthesis by organophosphorus compounds. *J. Food Prot.* 43(5); 1980; 381-4

1303 EL-GENDY (SM) and MARTH (EH). Proteolytic and lipolytic activities of some toxigenic and nontoxigenic Aspergilli and Penicillia. *J. Food Prot.* 43(5); 1980; 354-5

1304 HOLLAND (GC). Education is the key to solving sanitation problems. *J. Food Prot.* 43(5); 1980; 401-3

1305 KAPLAN (OB) and ZALKIND (D). Improved inspection scheduling for food service establishments. *J. Food Prot.* 43(5); 1980; 408-9

Theoretical and experimental considerations indicate that overall sanitation scores for a community's foodservice establishments would improve if the frequency of sanitation inspections were made to vary according to perceived risks attributable to sanitation deficiencies. AA

PUBLICATIONS OF

CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE, MYSORE – 570 013

National Information Centre for Food Science (NICFOS)

1.	Directory of Indian Processed Foods and Allied Industries.		Rs. 50.00
2.	Home Scale Processing & Preservation of Fruits & Vegetables.	English Edition	4.50
		Hindi Edition	1.00
3.	Balanced Diets and Nutritive Value of Some Common Recipes.	English Edition	5.50
		Kannada Edition	3·75
4.	Symposium on Proteins, 1962.		15.00
5.	Proceedings of the International Symposium on Protein Foods and Concentrates.		25.00
6.	Mango—An Industrial Profile, 1978.		8.00
7.	Food and Industrial Enzymes in India—A 1977 Profile		250.00

List of Bibliographies

1.	Select List of Books on Food Science and Technology in CFTRI Library, 1970		(out of stock)
2.	Refrigerated, Frozen, Cold Stored Fish, 1970.		-do-
3.	Egg and Egg Products, 1966–70, 1971.		-do-
4.	Pollution, 1965–70, 1971,		-do-
5.	Indian Information on Food Technology, 1966–69, 1971.		-do-
6.	Reference Materials Available in CFTRI Library, 1971.		-do-
7.	Parboiling of Paddy, 1972.,		-do-
8.	Alcoholic Beverages, 1965–71, 1972.		-do-
9.	Indian Institutions in the Field of Food Technology and Related Science, 1972.		-do-
10.	List of CFTRI Publications, 1950–70, 1972.		-do-
11.	Spices, 1966–72, 1974.		-do-
12.	Applied Nutrition and Dietetics in India, 1962–72, 1974.		-do-
13.	Refrigeration and Its Application for the Storage of Fruits and Vegetables, 1969–73, 1974.		-do-
14.	Fish Technology, 1969–73, 1974.		-do-
15.	Development of Fish Technology in India, 1964–73, 1975.		-do-
16.	Catalogue of Periodicals in CFTRI Library, 1975.		-do-
17.	Poultry Technology—World Over, 1970–75, 1976.		-do-
18.	Poultry Technology in India, 1966–75, 1976.		-do-
19.	Sorghum, Maize and Millets in India, 1960–70, 1976.	Available	Rs. 50.00
20.	Sorghum, Maize and Millets—World Over, 1970–75, 1976.	-do-	60.00
21.	Storage of Food Grains in India, 1945–72, 1978	-do-	50.00
22.	Technology Transfer, 1978.	-do-	25.00
23.	Indian Food Patents, 1978.	-do-	50.00
24.	Confectionery, 1974–78. 1979.	-do-	20.00
25.	Directory of On going Projects in Food Science & Technology and Related Areas in India	-do-	50.00
26.	By Products from Food Industries : Utilisation and Disposal : A Select Bibliography		50.00
27.	Pepper and Pepper Products : An Annotated Bibliography 1970-80.		50.00

Periodicals

1.	Food Technology Abstracts—Monthly—Annual Subscription		Rs. 45.00
2.	Food Digest (Quarterly) — -do-		30.00
3.	Food Patents (-do-) — -do-		15.00
4.	Ahara Vignana—Kannada (Bi-monthly Popular Magazine)	-do-	2.00
5.	Khadya Vijnan—Hindi (Quarterly Popular Magazine)	-do-	1.00

GENERAL

1306 SUKHATME (PV). On measurement of poverty. *Econ. Pol. Wkly.* 16(32); 1981; 1318-24

1307 KOHLI (PK). Corporate planning for research and development. *East. Econ.* 77(2); 1981; 53-5

1308 ANON. Modernising technology. *East. Econ.* 77(2); 1981; 48-50

1309 SCHEFER (E). Developing trends in the flour milling industry. *Indian Miller.* 11(6); 1981; 5-19

An analysis of the current development, situation in the milling industry has been presented under three headings: automation, environmental problems and economy in operation. Several possible solutions to problems encountered are also discussed. MVG

1310 TEALE (S). Britan's battle of the bottled waters. *Food Eng. Int.* 6(2); 1981; 19,21, 23-4

1311 READ (RO). Food safety and regulations. A Canadian perspective. *Food Drug. Cosmet. Law J.* 36(3); 1981; 120-28

1312 ADHIKARI (M) and GHOSH (SK). Desalination of water with clay membrane (II). *J. Inst. Chem. India.* 53 (Pt.5); 1981; 231-3

Tetra-alkyl ammonium derivatives of bentomite clay under compaction have been subjected to a flow of salt solution under different pressures, and the results of malt rejection, change of concentration, and water flux of the filtered solution are presented. The tetra-butyl ammonium clay has a slight advantage over both tetra-ethyl and tetra-methyl clay, because the latter exhibit poorer water permeability and salt rejection. (For Part I see *J. Inst. Chem. India.* 52; 1980; 11). KMD

1313 ANON. Solvent extraction: A greasy mess. *Econ. Scene.* 6(9); 1981; 58-9

FOOD PROCESSING AND PACKAGING

1314 BEE (GR) and HONTZ (LR). Detection and prevention of post-processing container handling damage. *J. Food Prot.* 43(6); 1980; 458-60, 464

PACKAGING

1315 BANERJEE (BL). Economic viability of jute industry. *Perfectpac.* 21(6-7); 1981; 16-7

Present plans of the Indian Jute Industry Research Association: (a) to develop new products to meet the changing requirements of consumers and diversify the end-uses of jute goods, and (b) to bring about economy in the manufacturing cost, have been outlined. KMD

1316 DARRINGTON (H). The American way of packaging. *Food Manuf.* 56(2); 1981; 17-23

1317 KUMAR (KR). Recent trends in food packaging in Japan. *Perfectpac.* 21(10/11); 1981; 5-10

Statistical data are given on the use of paper and paper-board, plastic pouches, metal and glass containers, shipping containers, and packaging machinery in Japan during recent years (1976 to 1979). The use of various types of packaging materials by different industrial sectors has been tabulated. KMD

1318 KAMALAMMA (V), BALASUBRAMANYAM (N) and ANANDASWAMY (B). Preliminary extraction studies on polyethylene films and containers to assess their suitability for food packaging. *Perfectpac.* 21(2)/22(1); 1981; 5-8

Extraction studies carried out on some polyethylene films and containers obtained from different sources indicate that the percentage of solids (by weight) extracted by hexane at 50 C and xylene at 25 C are, in general, well below the limits of 5.5% and 11.5% respectively specified by the ISI, BPF, and FDA (U.S.A.) regulations. The percentage of extractives obtained with hexane depends on the nature of the polymer (HDPE or LDPE), thickness of the film, and the black pigment added to the film. Evaporation of xylene under an atmosphere of oxygen or nitrogen results in similar extractive values. KMD

1319 ANON. Foil-on-glass packaging. Applies foil to glass containers in West Germany. *Food Eng. Int.* 6(2); 1981; 27-8

FOOD ENGINEERING AND EQUIPMENT

1320 ORTLER (K) and HERRMANN (K). Measures to improve the measurement technology in the enterprises of the VVB Kuhl-und Lagerwirtschaft (Refrigeration and storage industry). *Lebensmittel-industrie.* 27(8); 1980; 341-4 (German)

Refrigeration equipment including different types of cold stores are characterized briefly: Measures for further improvement of the instrumentation, necessary for obtaining measurements that would indicate satisfactory operation of the refrigeration and freezing processes have been reported. VR

FOOD CHEMISTRY AND ANALYSIS

1321 SECK (S) and CROUZET (J). Formation of volatile compounds in sugar-phenylalanine and ascorbic acid-phenylalanine model systems during heat treatment. *J. Food Sci.* 46(3); 1981; 790-93

Results of heating for 99 C and for 1.8 minutes of model systems containing dilute solution of sugar (glucose or fructose) or ascorbic acid and phenylalanine showed that furfural was the only one furan derivative formed under these conditions. Quantitatively, ascorbic acid was the main precursor of furfural. The other derivatives which are formed in tomato juice heated as above, namely, 5-methyl furfural, 2-acetyl furfuran, 5-methyl-2-acetyl furfuran and furfuryl alcohol were not formed. Phenyl acetaldehyde formation could be explained by Strecker degradation of phenylalanine rather than direct thermolysis. Thermal degradation of phenylalanine was responsible for the aromatic hydrocarbon found in the model systems studied. MVG

1322 SAGREDOS (AN), SINHAROY (D) and VON JAN (E). A contribution to the determination of polycyclic aromatic hydrocarbons in smoked foodstuffs via caffeine complexes. *Dtsch. Lebensmittel-Rundschau.* 77(1); 1981; 33-6

The smoked product is saponified, and subsequently the polycyclic aromatic hydrocarbons (PAH) are extracted with cyclohexane and isolated from this by complexing with caffeine in a formic acid solution The caffeine-PAH complexes are then decomposed and the PAH are reextracted with cyclohexane and subsequent purification on a silica gel column. Finally, a group separation of PAH is carried out, using aluminium oxide coated TLC sheets. The individual PAH are evaluated via UV spectroscopy or fluorescence measurement. This method is versatile for routine analysis of 3,4-benzopyrene as well as for determining other PAH occurring in smoked foodstuffs. AA

1323 BOLAND (FE), LIN (RC), MULVANCY (TR), McCLURE (FD) and JOHNSTON (MR). pH determination in acidified foods. Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 332-6

1324 COX (DH) and BIBB (AE). Hydrogen selenide evolution - electrothermal atomic absorption method for determining nanogram levels of total selenium. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 265-9

FOOD MICROBIOLOGY

1325 NAGASHIMA (M), NOGUCHI (S) and SUZUKI (T). Acclimation of sludge for efficient removal of nitrogen from fermentation wastewater. *J. Ferment. Technol.* 59(1); 1981; 49-53

1326 PESCHE (D). Cooling of industrial fermenters and recovery of energy. *Ind. Alim. Agric.* 97(5); 1980; 475-81 (French)

It is possible to cool a fermenter with a steam-jet refrigerator, and thereby recover the heat of fermentation. For this purpose, a pilot machine has been operating satisfactorily. After optimization, this method is less expensive than the usual cooling tower. When applied to fermentation at low pressure, this method definitely cuts down the cost of alcohol production from agricultural raw materials. Various schemes for biomass production can be worked out; among them, the most interesting possibility appears to be the association of several fermentations among themselves. KMD

1327 ADAMS (DM) and BRAWLEY (TG). Factors influencing the heat resistance of a heat-resistant lipase of *Pseudomonas*. *J. Food Sci.* 46(3); 1981; 673-6

The extra-cellular lipase produced by *Pseudomonas* sp. MC 50 was heat resistant over the temperature range 100-150 C with the D-values ranging from 40 minutes at 100 C to 84 seconds and 150 C and the zD-value was 36 C. It was most resistant at pH 8.5 and below pH 6.5, its survival was less than 10% of that at pH 8.5. In heated emulsions, survival or lipase was affected by the type of oil, its concentration and the type of stabiliser. Stabiliser type and concentration had little effect. EDTA treatment rendered the lipase fully heat resistant; heating with $CaCl_2$ (solutions of 3-120 mM) resulted in decline of survival rate. MVG

1328 ADAMS (DM) and BRAWLEY (TG). Factors influencing the activity of a heat-resistant lipase of *Pseudomonas*. *J. Food Sci.* 46(3); 1981; 677-80

Coconut oil, corn oil, butter oil and olive oil were hydrolysed by *Pseudomonas* sp. MC 50 lipase, the lipase activity being maximum in 1% corn oil. Effects of pH and temperature varied with the substrates used. The pH and temperature optima were in the range 8-9 and 35-40 C respectively. Of the nine emulsifiers tested, Na deoxycholate, lecithin, Santone 8-1-0 and EC117M supported significant lipase activity; three others did not support lipase activity and even appeared to inhibit lipase activity. The concentration of the emulsifier affected the lipase activity. All the stabilisers tested (Gum arabic, Na alginate, Xanthan gum, locust bean gum and carageenam) supported lipase activity though with variations. The stabilised concentration also affected lipase activity upto 0.36%, above which it had no effect. MVG

YEAST

1329 NEAME (C). New use for brewer's yeast. *Food Manuf.* 56(2); 1981; 53-61

1330 ALVAREZ (RJ), CABELLO (A) and OTERO (M). A note on the biological value and digestibility of Cuban torula yeast dried by different methods. *Cuban J. Agric. Sci.* 15(1); 1981; 71-5

Thirty six male albino rats recently weaned were used to evaluate the effect of two drying methods (spray and drum) in the production of Cuban torula yeast on the biological value and digestibility of its protein through studies on the increase of body N. The values of net protein utilization (NPU) were: 53.8; 35.9 and 42.6 for casein treatments (control) and yeast dried by spray and drum, respectively. Values for *in vitro* digestibility (%) were: 92.1; 67.7 and 69.8 for casein and torula yeast dried by spraying and drum, respectively. The amino acid composition of both yeast did not show significant differences. AA

1331 SHIMAZU (Y) and WATANABE (M). Effects of yeast strains and environmental conditions on formation of organic acids in must during fermentation. *J. Ferment. Technol.* 59(1); 1981; 27-32

1332 SPICHER (G) and SCHRODER (R). The microflora of sourdough. VIII. Communication: Growth factors of yeasts in sourdough starters. (Reinjuchtsauer) IX. Communication: Comparative investigations over the performance of lactic acid bacteria occurring in starter cultures. (Genus *Lactobacillus beijerinck*) *Z. Lebensmittel-Unters. Forsch.* 170(2); 1980; 119-23, 262-66 (German)

MUSHROOM

1333 SRINATH (D) and CHANDRIKA PRASAD. Development of *Lasioderma serricorne* (F.) (Coleoptera: Anobiidae) on stored black mushroom, (*Morchella esculenta*) (Linn.) Pers. *Bull. Grain Technol.* 18(3); 1980; 233-5

FOOD ADDITIVES

1334 VANDEVENTER (P). Additives, technological aids, and agro-food industries. *Ind. Alim. Agric.* 97(5); 1980; 457-67 (French)

The author has reviewed the substances that are used as additives -

colours, preservatives, antioxidants; emulsifiers, stabilizers, thickeners, and gelling agents; enzymes; and taste enhancers - the purposes for which they are employed, the risks involved in their use, and the precautions that have to be taken. KMD

1335 ELTON (GAH). Additives and contaminants in the food supply. Part 2. *Food Technol. NZ.* 16(1); 1981; 61,63

Discusses aflatoxin and its role as a food toxicant and the need for techniques for detoxification of contaminated foods. BSN

1336 GERTZ (C) and HILD (J). Various methods for the determination of preservatives in food. I. Extraction and spectrophotometric determinations. II Gas chromatography, high performance liquid chromatography. TAS method. *Z. Lebensmittel-Unters. Forsch.* 170; 1980; 103-9, 110-4

I. In the Federal Republic of Germany, formic acid, benzoic acid, propionic acid, sorbic acid and the esters of P-hydroxy benzoic acid were permitted as food additives. They can be extracted together from acidified materials by means of perforation with ether. During distillation the preservatives are fixed by sodium hydroxide. The alkaline extract can then be used directly for various photometric (Part I) and chromatographic (Part II) determinations. All preservatives, except propionic acid can be identified and determined by simple and specific colour reactions. From the alkaline extract, benzoic acid, sorbic acid and the esters of P-hydroxy benzoic acid can be separated as the free acid by thin layer chromatography on silica gel. Determination of the remission at 232 nm and 260 nm and of the reduction in fluorescence and employed for the photometric *in situ* evaluation of the thin layer chromatograms.

II. For the quantitative determination of preservatives in food, analysis were carried out by means of GLC, HPLC and TLC according to the TAS method. Using the alkaline extract (sample preparation see Part I) the preservatives can be analysed as free acid or appropriate ester on the same GLC column without any interference from coextractives. A fast and accurate HPLC determination can be achieved by direct injection of the alkaline extract. All preservatives were well separated and detected at a wavelength of 225 or 232 nm. As a quick test, the qualitative estimation of TLC (TAS) method is suggested and a suitable solvent system is proposed. AA

1337 RUBACH (K), BREYER (CH) and KIRCHHOFF (E). Isotachophoretic determination of preservatives. *Z. Lebensmittel-Unters. Forsch.* 170(2); 1980; 99-102 (German)

The preservatives, sorbic acid, benzoic acid, methyl-, ethyl-, propyl ester of p-hydroxybenzoic acid and propionic acid can be determined qualitatively in one step by isotachophoretic separation based on the different electrophoretic mobilities of these compounds. The determination involves a direct extraction step in the Extrelut-columns, where the preservatives are separated from the food sample, mainly from the lipid phase. The whole analytical procedure is short and recoveries are good. There is no interference by other substances and the range of concentrations for which a determination is possible is large and encompasses virtually all concentrations used in commercial practices. AA

1338 MAKINEN (KK) and SODERLING (E). Effect of xylitol on some food-spoilage microorganisms. *J. Food Sci.* 46(3); 1981; 950-51

Xylitol (0.5%) inhibited the growth of *Clostridium butyricum* and *Lactobacillus bulgaricus* and strongly retarded gas production by these organisms. It also inhibited the growth of *Saccharomyces cerevisiae*, *Escheri-*

coli and *Salmonella typhii*, but not *Aspergillus flavus*. A mixture of xylitol (0.5%) and glucose (0.5%) exhibited less inhibition. $^{14}C(U)$-xylitol was not taken up by the cells during growth. It was suggested that xylitol with its favourable organoleptic and physiological properties might be of value in the preservation of certain foods. MVG

1339 WALLER (AR) and CHASSEAUD (LF). The metabolic fate of (^{14}C) coumarin in baboons. *Food Cosmet. Toxicol.* 19(1); 1981; 1-6

1340 COX (EA) and REED (GF). High performance liquid chromatographic determination of intermediates and two reaction by-products in FD & C Red No. 40: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 324-31

Nine laboratories participated in a collaborative study of an ion exchange high performance liquid chromatographic procedure for determining the intermediates and 2 reaction by-products in FD&C Red No.40: cresidine sulphonic acid (CSA), Schaeffer's Salt (SS), 4,4'-(diazoamino)bis(5-methoxy-2-methylbenzenesulphonic acid) (DMMA), and 6,6'-oxybis(2-naphthalenesulphonic acid) (DONS), respectively. The repeatability and reproducibility standard deviations (absolute) found in the study were 0.012 and 0.019 for CSA at the 0.2% level, 0.004 and 0.006 for DMMA at the 0.1% level, 0.067 and 0.087 for DONS at the 1% level, and 0.015 and 0.020 for SS at the 0.3% level, respectively. AA

1341 ROGSTAD (A) and REINSKOU (T). Evaluation of antioxidant activity. I. Application of an enzyme-catalysed system. *J. Am. Oil Chem. Soc.* 57(7); 1980; 189-91

1342 ROGSTAD (A). Evaluation of antioxidant activity. II. Application of a heme-catalysed system. *J. Am. Oil Chem. Soc.* 57(7); 1980; 191-3

1343 KURECHI (T) and YAMAGUCHI (T). Studies on the antioxidants. X. Oxidation products of concomitantly used butylated hydroxyanisole and ethyl protocatechuate. *J. Am. Oil Chem. Soc.* 50(7); 1980; 216-9

1344 KURECHI (T) and KATO (T). Studies on the antioxidants. XI. Oxidation products of concomitantly used butylated hydroxyanisole and butylated hydroxytoluene. *J. Am. Oil Chem. Soc.* 50(7); 1980; 220-3

1345 RIKANS (LE), GIBSON (DD), McCAY (PB) and KING (MM). Effects of butylated hydroxytoluene and acetylaminofluorene on NADPH-cytochrome p-450 reductase activity in rat liver microsomes. *Food Cosmet. Toxicol.* 19(1); 1981; 89-92

The inclusion of BHT and/or AAF in the diets consistently produced marked decreases in cytochrome P-450 reductase activity, regardless of the amount and type of dietary fat. In contrast, there was no inhibition of reductase activity when the compounds were added *in vitro* to liver microsomes. AA

1346 DUFF (M). Relative flavouring effects of savoury nucleotides. *Food Flavour. Ingred. Packag. Process.* 3(5); 1981; 11

CEREALS

1347 POMERANZ (Y). Field-laboratory interactions to advance grain research. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 240-55

1348 SIEBERT (G). New standards for the cereal industry. *Lebensmittel-Industrie.* 27(8); 1980; 347-50 (German)

Several standards have been worked out or revised for the cereal processing industry in 1979. These standards are explained briefly in the article. AA

1349 DAVIS (KR). Proximate composition, phytic acid, and total phosphorus of selected breakfast cereals. *Cereal Chem.* 58(4); 1981; 347-50

Twelve cereals that are promoted as natural foods or high-fiber cereals were assayed for proximate composition and for phosphorus and phytic acid contents. Proximate composition was found to be close to published values and to product label claims. Phosphorus content ranged from 0.206% in Nature Valley Granola Bar to 0.592% in Roman Meal (moisture free basis). Phytic acid content ranged from 0.13% in Quaker 100% Natural Cereal to 1.42% in Roman Meal. Five of the products had 1% or more phytic acid. None of the cereals had a phytate-zinc molar ratio less than the 6:1 that has been reported to prevent zinc depletion. Recommendations are made to consumers, dietitians, and manufacturers of cereals to be aware of potential problems so that dietary or other compensations can be made. AA

PADDY

1350 VASAN (BS). Handling of high moisture paddy during wet season : A practical approach to the existing problems. *Bull. Grain Technol.* 18(3); 1980; 223-32

Aspects covered include, minimising loss by use of mechanical dryers. inadequate drying capacity, chemical treatment with common salt, soil and husk powder, application of urea, acetic acid, application of silaging process, packaging technology and problems with the chemical treatment. BSN

1351 GUJAR (GT). A note on survey of storage loss in paddy in Gujarat State. *Bull. Grain Technol.* 18(3); 1980; 236-7

RICE

1352 BHATTACHARYA (KR) and SOWBHAGYA (CM). Size and shape classification of rice. *IL Riso.* 29(3); 1980; 181-5

Recent literature on size and shape classification of rice have been examined on the basis of a study of 172 varieties (largely from India) and on 55 varieties of South East Asia. A new classification with appropriate terms and abbreviations has been proposed. The grain type can be indicated by these abbreviations in all reports on work related to rice. AA

1353 MATTHEWS (J), WADSWORTH (JI) and SPADARO (JJ). Chemical composition of Starbonnet variety rice fractionated by rough-rice kernel thickness. *Cereal Chem.* 58(4); 1981; 331-4

Two lots of Starbonnet variety long-grain rice were used to study the variation of kernel composition with kernel thickness. The rough rice was

separated by thickness into six fractions. Portions of each fraction were shelled and milled under identical conditions. Proximate compositions, amylose contents, vitamin contents, and amino acid profiles were determined. As the kernel thickness increased, the brown and milled rice fractions had progressively lower protein, lipid, and crude fiber contents and higher starch contents. The amylose content and the amylose-amylopectin ratio both increased as thickness increased. The vitamin contents of the thin kernels tended to be higher than those of the thick kernels. Amino acid profiles of the unfractionated rice and the thin kernels showed essentially no differences. Mathematical relationships between kernel thickness and various properties were developed. AA

1354 JULIANO (BO), PEREZ (CM), BLAKENEY (AB), BRECKENRIDGE (C), TORO (DC), CHOUDHURY (NH), KONGSEREE (N), LAIGNELET (B), MERCA (FE), PAULE (CM) and WEBB (BD). Report of the International cooperative testing on gel consistency of milled rice. *IL Riso.* 29(3); 1980; 233-7

In various laboratories, ten collaborators tested the reproducibility of the gel consistency test using the same set of six ground milled rice samples. The gel consistency values of samples with hard and soft gel had good reproducibility; those of medium-gel samples were variable. The dispersion of the flour in the boiling water bath was a critical step. AA

1355 BOXALL (RA), LAGRA (J), MARTINEZ (E) and MARTINEZ (J). Post-harvest losses of rice in the Dominican Republic. *Trop. Stored Prod. Inf.* 42; 1981; 5-10

1356 HAYABUCHI (H), IKEDA (M), YOSHIMURA (T) and MASUDA (Y). Relationship between the consumption of toxic rice oil and the long-term concentration of polychlorinated biphenyls in the blood of Yusho patients. *Food Cosmet. Technol.* 19(1); 1981; 53-5

The relationship between the consumption of the toxic rice oil and the concentration of polychlorinated biphenyls (PCBs) in the blood for five or more years after the poisoning was examined in Yusho patients. In each year from 1973 to 1976, significant positive correlations were observed between the blood PCB concentration and the total amount of the rice oil consumed, but not between the blood PCB concentration and the amount of the rice oil consumed per kg per day. AA

WHEAT

1357 SEKHON (KS), SAXENA (AK), RANDHAWA (SK) and GILL (KS). Effect of Karnal bunt disease on quality characteristics of wheat. *Bull. Grain Technol.* 18(3); 1980; 208-13

Karnal bunt is a serious disease of wheat caused by infection from *Neovossia indica* (Mitra and Mundkur). Bread, cookies and chapaties prepared from wheat infected with Karnal bunt at 1.5,3.0,5.0 and 10.0% levels were evaluated by (i) farinographic water absorption, (ii) rheological properties, (iii) protein content, (iv) sedimentation value, (v) total sugars, (vi) diastatic activity, (vii) loaf and specific volume (viii) crumb structure and colour and organoleptic qualities, (ix) flavour, (x) colour and taste. Presence of bunted grains did not affect (i), (ii), (iii), (iv) and (v), while (vi) was affected by their presence. Bread was not influenced significantly by (vii), however (viii) and (xii) of bread were severely affected. Similarly (ix) and (xi) of cookies were also affected. Increased spread factor was observed in cookies. Bread, cookies and chapaties

prepared from bunted grain upto 3% were acceptable by consumers. PER was not affected significantly upto 6.5% disease level in rat feeding experiments done for 4 weeks. BSN

1358 WASZCZYNSKYJ (N), RAO (CS) and DA SILVA (RSF). Extraction of proteins from wheat bran: Application of carbohydrases. *Cereal Chem.* 58(4); 1981; 264-6

Proteins (N x 5.7) were extracted from commercial full-fat wheat bran, using a wet alkaline extraction procedure at pH 8.5. The extract thus obtained contained 30% of the total nitrogen originally present in the bran. However, the yield of total nitrogen in the extract could be increased to 38.5% with a pretreatment containing carbohydrases (cellulase, hemicellulase, and pectinase) followed by the normal extraction procedure. AA

1359 KRUGER (JE) and TIPPLES (KH). Modified procedure for use of the Perkin-Elmer Model 191 grain amylase analyzer in determining low levels of α-amylase in wheats and flours. *Cereal Chem.* 58(4); 1981; 271-4

The Perkin-Elmer Model 191 grain amylase analyzer was employed at its highest possible sensitivity to determine the α-amylase levels in wheats and flours containing low to moderate levels of the enzyme. β-Limit dextrin (0.5%) was used as substrate, and the rate of decrease in turbidity effected by enzyme was followed on a recorder attached to the grain amylase analyzer. Straight-line relationships were found between increases in concentration of enzyme and rates of decrease in nephelos per minute. The method was evaluated and found satisfactory for assaying α-amylase levels in wheats ranging in Hagberg falling numbers from 240 to 460 seconds and in amylograph viscosities from 125 to 925 BU. The method has some advantages over an automated fluorometric procedure for α-amylase presently being used by the authors. AA

1360 BHATT (GM), PAULSEN (GM), KULP (K) and HEYNE (EG). Preharvest sprouting in hard winter wheats: Assessment of methods to detect genotypic and nitrogen effects and interactions. *Cereal Chem.* 58(4); 1981; 300-302

1361 BOTHAST (RJ), ANDERSON (RA), WARNER (K) and KWOLEK (WF). Effects of moisture and temperature on microbiological and sensory properties of wheat flour and corn meal during storage. *Cereal Chem.* 58(4); 1981; 309-11

Wheat flour and corn meal were stored at moisture ranging from 11 to 18% and temperatures of 25 and 34 C for 18 months. Samples were assayed at 0,0.5,1.5,3,6,9,12 and 18 months. Microbial quality was monitored during storage by determining CO_2 in the headspace of each storage container and the total aerobic bacteria and mold counts. A sensory evaluation was made on each product. In general, bacteria did not grow under the relatively dry conditions used in this study, and their numbers diminished with time. However, mold counts increased in products stored at 15 and 18% moisture, reaching maximum numbers by three to six months, and then decreased during the remaining storage. *Aspergillus glaucus* and *A. candidus* were the predominant molds observed. Generally, increases in CO_2 in the headspace paralleled increases in mold counts and could be used to detect early microbial activity. High CO_2, high mold counts, and low flavour and odour scores were associated with storage of both products at 15-18% moisture and at 25 and 34 C. This study indicates that product quality cannot be maintained beyond six months at 15% moisture and 25 C or beyond 15 days at 18% and 25 C. Quality deteriorates more rapidly at 34 C than at 25 C at these moisture levels. AA

1362 DANNO (G). Extraction of unreduced glutenin from wheat flour with sodium dodecyl sulphate. *Cereal Chem.* 58(4); 1981; 311-3

1363 FINNEY (KF), NATSUAKI (O), BOLTE (LC), MATHEWSON (PR) and POMERANZ (Y). Alpha-amylase in field-sprouted wheats: Its distribution and effect on Japanese-type sponge cake and related physical and chemical tests. *Cereal Chem.* 58(4); 1981; 355-9

1364 SHERJUGJIT SINGH and CHAWLA (RP). Comparative persistence of residues of primiphos-methyl on stored wheat, maize and paddy. *Bull. Grain Technol.* 18(3); 1980; 181-7

Periodic analysis of stored wheat, maize and paddy, treated with primiphos-methyl at 4 and 8 ppm by GLC showed that the insecticide degradated slowly by about 50 per cent in 6 months. The persistence pattern was similar on all the three types of grains. In general, the rate of loss of the insecticide was faster at 8 ppm level than that at 4 ppm. Most of the residue (97.2 to 98.3%) in paddy was in husk and in maize; 77.1 to 81.9% of the insecticide was lost during processing into pop corn. AA

OAT

1365 BEKES (F) and LASZTITY (R). Isolation and determination of amino acid sequence of avenothionin: A new purothionin analogue from oat. *Cereal Chem.* 58(4); 1981; 360-61

TRITICALE

1366 ZERINGUE (HJ) Jr., SINGH (B) and FEUGE (RO). Triticale lipids: Composition and bread-making characteristics of triticale flours. *Cereal Chem.* 58(4); 1981; 351-4

Ten lipid-altered flours of southern-grown triticale were evaluated by standard baking tests and other performance tests. The lipid contents of whole-grain and milled flours of triticale were altered by four defatting procedures using three different solvents and by one storage procedure conducted at room temperature in controlled relative humidity. Volume of loaves made from whole-grain and milled flours were affected little when lipids (mostly neutral) were removed with haxane, but volume decreased when the more polar lipids (glycolipids and phospholipids) were also extracted, using 95% ethanol or 80% aqueous butanol. When hexane-defatted, milled flour was fractionated into gluten and starch-water-soluble fractions and the gluten fraction extracted with 80% 1-butanol, the reconstituted flour resulted in a loaf volume of 210 cc compared to a volume of 155 cc for an unfractionated milled flour extracted with 80% 1-butanol. Whole-grain flour stored in air at a relative humidity of 64% for seven weeks gave a better loaf volume than did the control (+15 cc), but milled flour stored under the same conditions resulted in a loaf volume lower than that of the control (-30 cc). Lipid content and composition of the untreated and treated flours are presented to explain the breadmaking characteristics of the defatted triticale flours. AA

PAPAD

1367 ANON. Papads - An exchange earner. *Profodéil Bull.* 15(4); 1981; 63-7
Article covers aspects like exports of papads from India; export policy; quality control; standards for papads; packing and storage of papads. BSN

MILLETS

1368 HAYWARD (LAW). The density of bagged millet. *Trop. Stored Prod. Inf.* 42; 1981; 21-2

SORGHUM

1369 ABDEL RAHMAN (AA) and FARRELL (EP). Use of an electrical conductance moisture meter to study tempering rates in grain sorghum. *Cereal Chem.* 58(4); 1981; 307-8
The rate of water penetration in grain sorghum during tempering was studied by employing autoradiography and an electric conductance moisture meter. Sorghum grain with an initial moisture content of 12.5% after two hours absorbed water faster than did grain with an initial moisture content of 10.8%. BSN

MAIZE

1370 WILSON (CM), SHEWRY (PR) and MIFLIN (BJ). Maize endosperm proteins compared by sodium dodecyl sulphate gel electrophoresis and isoelectric focusing. *Cereal Chem.* 58(4); 1981; 275-81

1371 VAN CAUWENBERGE (JE), BOTHAST (RJ) and YOUNG (DC). Comparison of controlled-release ammonia solutions and aqueous ammonia for preserving high-moisture maize. *Cereal Chem.* 58(4); 1981; 293-5
Controlled-release ammonia solutions were compared with aqueous ammonia as preservatives for high-moisture maize. The release solutions were composed of ammonia, urea, biuret, and urease enzyme. These components were combined in such a way that immediate, slow, and very slow ammonia release was possible. Freshly harvested, high-moisture (25%) yellow dent maize was treated in each of two trials. The total weight of ammonia was 0.2% of the total weight of maize in trial A and 0.8% in trial B. An initial free ammonia concentration near 0.16% (weight of NH_3 per weight of maize) was necessary to prevent microbial deterioration at the beginning of storage. Consequently, the controlled-release ammonia solutions applied in trial A were ineffective. However, at the higher treatment level of trial B, these solutions controlled microbial deterioration three times longer than did the aqueous ammonia solution, from which all ammonia was available immediately. AA

1372 WU (YV), SEXSON (KR) and WALL (JS). Protein-rich residue from corn alcohol distillation: Fractionation and characterization. *Cereal Chem.* 58(4); 1981; 343-7
The material from the base of stills after corn alcohol distillation was screened to separate a slurry from screened residue. The slurry was

centrifuged to obtain a centrifuge cake and a supernatant. The supernatant contained materials that were smaller than 10,000 in molecular weight and accounted for 20% of the dry weight and 20% of the total nitrogen. The screened residue and the centrifuge cake were combined into base-of-still residue, which accounted for 80% of the dry weight and 80% of the total nitrogen. The base-of-still residue was extracted sequentially with water, sodium chloride, 70% ethanol, 70% ethanol plus dithiothreitol, sodium hydroxide plus dithiothreitol, and sodium hydroxide plus sodium dodecyl sulphate plus dithiothreitol at pH 11.9. The nitrogen content and amino acid composition of each fraction were determined. The nitrogen in base-of-still residue was considerably less soluble than that in ground corn when extracted with water, sodium chloride, 70% ethanol, 70% ethanol plus dithiothreitol, and borate plus sodium dodecyl sulphate plus dithiothreitol at pH 10. The lower nitrogen solubility of the base-of-still residue is probably a result of denaturation of protein and may account for the greater feed efficiency for ruminants of corn distillers grains than of corn. The denatured protein is degraded less in the rumen, and a higher proportion is digested and absorbed from the lower gastrointestinal tract for maximum growth. AA

BAJRA

1373 VENKATESAN (V). Separation of ergot from infected bajra (*Pennisetum typhoideum*. L). *Bull. Grain Technol.* 18(3); 1980; 213-5

A mechanical method, utilising the variance of specific gravity was attempted to separate the ergoty grains from the samples containing 0.45 to 3.20% of ergot. With the aid of a compartmental separator (Schule make), a fairly good separation of ergoty grains was achieved by maintaining the throughput at 1 t/h and with a stroke of 116. After separation, the sample was found to contain 0.005 per cent of ergoty grains as against the tolerance level of 0.05 per cent prescribed in the PFA Act. AA

PULSES

1374 PATEL (PR), YOUNGS (CG) and GRANT (DR). Preparation and properties of spray-dried pea protein concentrate cheese whey blends. *Cereal Chem.* 58 (4); 1981; 249-55

An air-classified pea protein concentrate (PPC) was blended with cheddar cheese whey (W). The resulting pea protein concentrate-cheese whey (PPCW) blend was given a low heat (LH) treatment at 63 C for 30 minutes or a high heat (HH) treatment at 85 C for 20 minutes and then concentrated and spray-dried. A third blend was prepared by giving only the W an HH treatment before blending it with the PPC. Samples of LH-PPC HH-PPC, LH-W, and HH-W were prepared separately under similar conditions. The (functional properties of PPCW blends were compared with those of LH-PPC, HH-PPC, LH-W, HH-W, two commercial nonfat dry milks (NDM) given low and high heat treatment, and two commercial soy-whey blends. The foregoing samples were also compared as bread ingredients. Among the blends, LH-PPCW had higher water hydration capacity, oil absorption, oil emulsification, and greater foam stability than did the two NDM or the soy-whey blends. Loaf characteristics of breads containing 6% LH-PPCW were equivalent to those of breads containing NDM and were slightly better than those of breads containing soy-whey blends. Sensory evaluation

showed no significant difference in flavour between breads containing LH-PPCW, HH-NDM, and the soy flour-whey blend. AA

BLACK GRAM

1375 REDDY (NR) and SALUNKHE (DK). Alpha-amylase inhibitor and phytohemagglutinins of black gram (*Phaseolus mungo* L.). *J. Food Biochem.* 4(4); 1980; 273-6

Black gram seeds and cotyledons from two origins, India and Thailand were evaluated for alpha-amylase inhibitor and phytohemagglutinating activities. Alpha-amylase inhibitor activity was absent in black gram seeds and cotyledons from two different origins. Phytohemagglutinating activity was not detected in the extracts of black gram seeds and cotyledons from two origins, tested against human A, rabbit, cow, and sheep blood erythrocytes. AA

GREEN GRAM

1376 KALPANA TIKKU, KOUL (O) and SAXENA (BP). Possible mode of action of vegetable oils to protect *Phaseolus aureus* Roxb. from *Bruchid* attack. *Sci. Cult.* 47(3); 1981; 103-5

The mechanism of protective action of groundnut, castor, coconut, and mustard oils against bruchids infesting stored green gram (*Phaseolus aureus*) was investigated by treating with 1 and 5 ml/kg of vegetable oil by infesting with freshly moulted adults of *Bruchid chinensis*. Adult mortality oviposition and emergence of progeny were affected by oil treatment. No differences were found among the different vegetable oils in their ability to control *Bruchids*. Results indicate two plausible factors as playing a role in controlling bruchids from multiplication. The first factor was an interference in water balance as indicated by undifferentiated and shrunken stage of eggs in samples treated with 5 ml/kg vegetable oil. The second factor was the ability of the vegetable oil to permeate the lipoid or wax layer on the inside of the chorion and coming into contact with developing embryo thereby breaking the existing barrier for further development. MVG

COW PEA

1377 SATYA VIR. Oviposition response and development of *Callosobruchus maculatus* Fabr. on different varieties of cowpea. *Bull. Grain Technol.* 18(3); 1980; 200-203

The oviposition response and development of *Callosobruchus maculatus* Fabr. on seven varieties of cowpea was studied. The beetle seemed to be guided in its oviposition on preference by colour, texture and volume of seed grain. Bright coloured smooth surfaces with greater seed volume were much preferred for oviposition. Egg laying was minimum on wrinkled surface. The development and percentage emergence of adults was not affected on the grains which were perferred for oviposition. On the basis of growth index and ovipositional preference as a combined criterion, CO.2 and J.C. 5 varieties were most resistant while V-38, P.T.B. 1 and C.G. II were highly susceptible and Sel-1476, K-39 were intermediate in resistance to insects. AA

OILSEEDS AND NUTS

1378 KAUL (VK), BANERJEE (A) and NIGAM (SS). Chemical investigation of the seeds of *Brassica oleracea* var. *acephala*. *J. Am. Oil Chem. Soc.* 50(7); 1980; 199-201

Fatty acid composition of the seed fat of *Brassica oleracea* variety *acephala* (Cruciferae) has been determined. Erucic acid has been found to be the major component followed by linoleic, oleic, linolenic, arachidic and palmitic acids. Traces of stearic and cicosenoic acids have also been detected. The unsaponifiable matter contained β-sitosterol, and defatted seeds showed the presence of sucrose. AA

1379 AHMAD (F), AHMAD (I) and OSMAN (SM). The C_{16} monoenoic acid of *Zanthoxylum alatum* seed oil. *J. Am. Oil Chem. Soc.* 50(7); 1980; 224-5

As a part of our screening program on unusual fatty acid-containing seed oils, we observed that the oil of *Zanthoxylum alatum* contains 15.4% of a C_{16} monoenoic acid. It was characterized as *cis*-9-hexadecenoic by the GLC analysis of oxidative cleavage fragments from an isolated monoene fraction. AA

COCONUT

1380 JAYALAKSHMY (A), KRISHNASWAMY (C), SATHYAVATHY K. KUTTY, SREEMULA NATHAN (H) and MATHEW (AG). Development of roasted flavour in coconut oil. *J. Plant Crops.* 8(2); 1980; 86-9

Coconut oil with an intense roasted flavour is preferred by certain sections of consumers. Further, such an oil has a better keeping quality than normal coconut oil due to the absence of highly susceptible ketone rancidity activity. The intense roasted and flavoured coconut oil for culinary and toilet purposes may be prepared by heating disintegrated copra at 160 C for 15 minutes. BSN

1381 PHILIP (S), MENON (MR) and THOMAS (EJ). Influence of moisture and weather conditions on microbial population in copra. *J. Plant Crops.* 8(1); 1980; 36-9

Mean bacterial (1.6804 to 2.399 log count x 10/g copra) and fungal population (0.8353 to 1.4806 log count x 10/g copra) present during the period January-December 1976, in copra samples collected from coconut oil mills in Trivandrum (Kerala) were influenced by moisture content of copra, relative humidity, temperature and rainfall. BSN

HAZELNUT

1382 GARGANO (A), MAGRO (A) and MANZO (P). Chemical characteristics of some hazel nut cultivars. *Ind. Aliment.* 20(180); 1981; 104-6 (Italian)

The fat content of S. Giovanni and Camponica varieties of hazel nut was 62.5%, and that of the variety Tonda Romana 66.4%. These are good values for industrial processing. Nuts of these cultivars can be preserved for 8-10 months. The variety Tonda Romana can be preserved for the longest period, while the variety Karidaty has the shortest shelf-life among nine varieties. KMD

GROUNDNUT

1383 SHANTHA (T) and SRINIVASA MURTHY (V). Use of sunlight to partially detoxify groundnut (peanut) cake flour and casein contaminated with aflatoxin B_1. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 291-3

Sunlight destroyed 83 and 50% of the toxin added to casein and groundnut cake flour, respectively. Equilibrium dialysis revealed that both casein and groundnut protein bind aflatoxin but the toxin bound to casein appeared more photo-labile than that bound to groundnut protein. AA

SOYABEAN

1384 CARMAN (GA). AMEGAH (R) and MATAS (J). Mitochondrial - associated CDP-diacylglycerol synthase activity in germinating soyabeans. *J. Food Biochem.* 4(4); 1980; 261-72

1385 IYENGAR (RB) and RAVESTEIN (P). New aspects of subunit structure of soyabean glycinin. *Cereal Chem.* 58(4); 1981; 325-30

1386 DONNELLY (LS) and BUSTA (FF). Heat resistant of *Desulphotomaculum nigrificans* spores in soy protein infant formula preparations. *Appl. Environ. Microbiol.* 40(4); 1980; 721-5

The heat resistance of *Desulphotomaculum nigrificans* spores was determined in soy protein infant formula preparations. *D. nigrificans* spores of highest heat resistance were produced in a 40% infusion of spent mushroom compost. Fraction-negative D_{121} C-values obtained in modified soy formula were 25.8 minutes for spores of ATCC 7946 produced at 55 C and 54.4 minutes for an isolate designated RGI 1, which was sporulated at 66 C. From the fraction-negative D-values, z-values were obtained of 6.7 C for ATCC 7946 and 9.5 C for RGI 1. Survivor-curve D_{121} C-values were 5.6 minutes for ATCC 7946 and 2.7 minutes for RGI 1 sporulated at 55 C and heated in modified soy formula. Corresponding D_{121} C-values in Butterfield phosphate buffer (pH 7.2) were 3.3 minutes (ATCC 7946) and 1.1 minute (RGI 1). The z-values generated from survivor-curve D-values were similar to those obtained by using fraction-negative procedures. In all instances the inactivation kinetics appeared to be linear. The isolate designated RGI 1, when sporulated at 66 C and heated in a modified infant soy formula, exhibited an extraordinary heat resistance far in excess of previous reports. AA

1387 ELLENRIEDER (G), BLANCO (S) and BONDONI (A). Thermal inactivation of trypsin inhibitors in aqueous extracts of soyabeans. Studies on substances that accelerate inactivation. *Cereal Chem.* 58(4); 1981; 291-3

1388 BRENNA (O), CANTONI (C) and SONCINI (G). Soy protein identification in meat by the stacking SDS (sodium dodecylsulphate) polyacrylamide gel electrophoresis method. *Ind. Aliment.* 19(174); 1980; 553-4 (Italian)

1389 NAKAYAMA (Y), SAIO (K) and KITO (M). Decomposition of phospholipids in soyabeans during storage. *Cereal Chem.* 58(4); 1981; 260-64

After soyabeans with a moisture level of 13% had been stored for six months at 35 C, 45% of the total phospholipids had decomposed, and 72% of the total phospholipids originally extracted with the oil was lost. Phosphatidylcholine and phosphatidylethanolamine decreased significantly, and phosphatidic acid and lysophosphatidylcholine increased in soyabeans

during storage. Considerable amounts of phospholipids were removed by the degumming procedure. However, only phosphatidic acid remained constantly at a high level in the degummed oil. No difference was found between soyabeans and extracted oil in fatty acid composition of phosphatidic acid. Phospholipase D activity was found in an acetate buffer extract of homogenized soyabeans. Inhibition of initially strong enzyme activity became weaker, the longer the soyabeans were stored. AA

COTTONSEED

1390 HORN (RJ) Sr. Differential settling test for evaluation of liquid cyclone classification performance. *Cereal Chem.* 58(4); 1981; 334-8

A differential settling test (DST) developed by the Southern Regional Research Centre utilizes small quantities of sample to assess the protein-classification efficiency of a commercial-sized liquid cyclone. The test can be applied to any grain or oilseed. In this study, cottonseed, corn germ and unblanched peanut samples were comminuted, slurried with hexane, and liquid classified, Protein-classified and recovery data are shown comparing dry-pin and wet-stone milling methods as evaluated by the DST and a subsequent liquid cyclone process (LCP) test on identically treated material. Results of the DST showed a maximum protein concentration for cottonseed, corn, and peanuts of 68.67, 24.06, and 75.79%, respectively. The results of LCP tests were 67.30,28.41 and 69.06%, respectively. LCP-processed unblanched peanuts, in addition to yielding a skin-free product approximating a protein concentrate, had a recovery rate of 73.8%,which suggests that the LCP is a possible commercial alternative to conventional solvent extraction methods for peanuts. AA

RAPESEED

1391 MAHESWARI (PN), STANLEY (DW) and VAN de VOORT (FR). Microwave treatment of dehulled rapeseed to inactivate myrosinase and its effect on oil and meal quality. *J. Am. Oil Chem. Soc.* 50(7); 1980; 194-9

Rapeseed was dehulled using a Palyi pneumatic attrition system which produced 62.66% clean dehulled seed. Dehulled rapeseed was preconditioned to 7,10 and 13% moisture levels, exposed to microwave irradiation for periods of up to 2.5 minutes and analyzed for residual thioglucoside glucohydrolase (myrosinase) activity. The 7% moisture samples heated slowly and required at least a 2.5 minutes treatment whereas 10 and 13% moisture samples heated more rapidly and required microwave exposures of 1.5 minutes or less for complete inactivation of the enzyme. The sulphur content of oils obtained from adequately microwave-treated samples (1.5 minutes for 10 and 13% and 2.5 minutes for 7% moisture samples) was equal to or lower than commercially processed crude rapeseed oils. The shorter microwave treatment of dehulled rapeseed produced considerably lighter oils and did not adversely affect the colour of the meal. It also destroyed some of the rapeseed glucosinolates and improved the meal palatability. However, goitrogenic properties of microwave-treated rapeseed meal evaluated by mice feeding experiments did not appear different from untreated rapeseed meal. AA

TUBERS AND VEGETABLES

BEETROOT

1392 ATCHUTA RAMAIAH (KV) and MOOKERJEE (A). Temperature induced permeability changes in beet root membranes: Effect of divalent cations and sugars. *Indian J. Exp. Biol.* 19(6); 1981; 561-3

Divalent cations like Ca^{2+}, Mg^{2+}, Zn^{2+}, and Pb^{2+}, and low molecular weight sugars like glucose, sucrose, and raffinose inhibited the heat-induced efflux of betacyanin from beet-roots. The thermostabilizing effect of Ca^{2+}, Zn^{2+}, and Pb^{2+} was more "persistent" than that of Mg^{2+}, or the sugars. The protective role of Ca^{2+} and of sucrose and glucose on the membranes, within the reversible range (heating at 45 C for 90 minutes) of thermal damage could be proved. KMD

POTATO

1393 KEMPF (W). Contribution to the mechanical dewatering of potato pulp. *Starch.* 32(1); 1980; 14-20

1394 MICA (B). Influence of different fertilizing doses on the content of non-starch materials in potatoes. *Starch.* 32(1); 1980; 21-3 (German)

1395 SCHALLER (A), BERGTHALLER (W) and KEMPF (W). Results of studies on the connection of sensory evaluation vs instrumental measurement of colour with dehydrated potato cubes. *Confructa.* 25(1/2); 1980; 9-15 (German)

Instrumental colour measurements were carried out with different samples of whole dehydrated potato cubes produced from stored raw material (storage time 6 months at about 8 C and about 95% relative humidity of storage atmosphere) using a tristimulus colorimeter with a special measuring cell of the authors own design. The colour of the same sample was evaluated visually by a test panel of five experts under daylight, using an "unstructured" rating scale. Parametric multiple and partial correction analysis of S (mean value of the colour evaluation by the test panel) vs a,b and L (of the R.S. Hunter a.b.L-colour space) showed that a significant (α=0.001) and very close (100 R^2=92.6) multiple correlation exists. The correlation could be described by a first order polynomial of the type S = f(L,a) with a standard error of estimate of about t 8.2. VR

1396 POLZHOFER (K) and NIEHUSS (M). Estimation of *Fusarium* toxins in potatoes by means of the chicken-embryo-assay. *Z. Lebensmittel-unters. Forsch.* 170(2); 1980; 124-8 (German)

Of three species cultivated, (*Fusarium avenaceum*, *F. coeruleum*, *F. sulphureum* and *F. solani*), only *F. avenaceum* grew well on potatoes. Cylindrical sticks were cut out from the potatoes at the locations with rot. These sticks were cut into discs of 1 mm thickness which were extracted with ethyl acetate. The extract was purified by liquid-liquid partition and used for the toxin-estimation by the chicken-embryo-assay. A significant mortality rate of 80-93% was found with rotten potatoes. Similar mortality rates were observed with potato tissue adjacent to the rotten parts of the potatoes, even though this tissue did not show any optical damage. Assuming that *Fusarium*-toxins caused the toxic effect,

the detection limit of the bio-assay method lies at 0.5 ppm toxin (expressed as diacetoxyscirpenol units). AA

TOMATO

1397 NARAYANA (N) and RAMA RAO (M). Quality improvement in tomato through cultural methods and nutrient applications. *Indian J. Hortic.* 37(3); 1980; 289-93

Trials were carried out on the tomato CV. Roma, on the red sandy loam soils of Tirupati during 1977-78. The mean fruit weight was significantly more in staked plants with or without pinching of laterals. Basel dressing of potash recorded higher fruit firmness. Pulp colour was brighter with potash applications. Fruits harvested from plots receiving 100 kg K_2O/ha, in three split does, without staking and pinching were significantly more fleshy than the other treatment combinations. However, the juice percentage remained unchanged. Potash applications helped in increasing the acidity of tomatoes. KMD

1398 THOMAS (RL), MORR (CV) and JEN (JJ). Oxidation of indoleacetic acid by a homogeneous tomato fruit peroxidase. *J. Food Biochem.* 4(4); 1980; 235-46

1399 THOMAS (RL) and JEN (JJ). The cytochemical localization of peroxidase in tomato fruit cells. *J. Food Biochem.* 4(4); 1980; 247-59

CUCUMBER

1400 SINGH (AK). Effect of dehydration and pH on the extractability of leaf protein concentrate (LPC). *Sci. Cult.* 47(9); 1981; 326-7

Leaf protein concentrate (LPC) was extracted from (i) *Madhuca indica* (Gmd), (ii) *Millettia ovalifolia* (Kurz) and (iii) *Sesbania sesban* (Linn) Merr. from fresh and dried (in an electric oven at 50±1 C for 24 hours) leaves. The percentage extractability of LPC from dried leaf samples were 12.7,10.9 and 6.4 for (i), (ii) and (iii) for fresh leaf, and 20.7,17.1 and 25.3 for dried leaf respectively. Extractability of LPC was maximum at pH 4.5 beyond which it decreased. It was suggested that fresh leaf samples were more suitable than dried ones for LPC extraction as dehydration affects cytoplasmic and chloroplastic fractions during LPC separation thereby reducing the yield. MVG

VEGETABLES

1401 BHALERAO (MM), VENKATESWARALU (U) and ANSARI (SL). Price spread in vegetables: A sample study in Kashi Vidyapeeth Block (Varanasi District). *Andhra Agric. J.* 26(5/6); 1979; 217-20

Various marketing charges and the price spread for major vegetables grown in Kashi Vidyapeeth Block, India (Banaras Hindu University Campus) and sold in the vegetable markets of Varanasi city were surveyed. The study revealed that the producers' share in the consumers' rupee in the case of majority of vegetables is very low. The wholesale and retail dealers are getting sizeable amount and thereby increasing the marketing costs. MVG

BREAD FRUIT

1402 LOOS (PJ), HOOD (LF) and GRAHAM (HD). Isolation and characterization of starch from breadfruit. *Cereal Chem.* 58(4); 1981; 282-6

The pulp of mature unripe breadfruit (*Artocarpus communis*) was freeze-dried. Starch was isolated from an aqueous slurry of the powder, and some of its physicochemical and structural properties were determined. Granular structure was evaluated by scanning electron, light, and polarized light microscopy. Molecular structure was studied by sequential hydrolysis with pullulanase and β-amylase and then fractionation of hydrolysis products by gel permeation chromatography. Starch granules were spherical and segmented (compound), 10-20 μm in diameter. Swelling and solubility exhibited a two-stage pattern and had values of 35-fold and 22%, respectively, at 95 C. A peak viscosity of 1,860 BU was observed at 95 C for an 8% starch suspension. Intrinsic viscosity of the starch solubilized in 1N KOH was 2.76cS. Amylose content was 18.2%, β-Amylolysis of the starch was 58%. Debranched amylopectin contained chains with degrees of polymerization of 15 and 38-45 in a molar ratio of 4.4:1. About 15% of the debranched β-limit dextrin consisted of high molecular weight (degree of polymerization $\geq$600) linear polymers. AA

FRUITS

1403 BALDI (M), BOVOLENTA (A), PENAZZI (L) and ZANONI (L). Decay of some pesticides on fruits treated with dimilin, orthene, and lannate. *Ind. Aliment.* 20(180); 1981; 87-90 (Italian)

The degradation of the active principles diflubenzuron, methomil, and acephate has been studied by quantitative determination of their residues in fruits, as a function of time. The experimental data have been used to derive a mathematical equation which indicates a reaction kinetic of the first order. Data relating to diflubenzuron are too few to draw any valid conclusion; however, in the case of methomil and acephate the quations permit us to say the 95% of these compounds will have disappeared after 21 days and 28 days respectively. KMD

1404 ANON. Market survey for preserved fruits and vegetables in Saudi Arabia and Kuwait. *Profodcil Bull.* 15(4); 1981; 14-9

Results of a field survey for preserved fruits and vegetables in Saudi Arabia are presented. The survey included mango products - pulp, juices and slices; pineapple products - slices, titbits, juice and pulp; tomato products - paste, puree, juice and ketchup; canned vegetable - okra, mixed vegetables, green peas and green beans; and pickles and chutneys from mangoes. MVG

RASPBERRY

1405 SZABO (SA). Investigations on the relationship between pH value and acidity in fruit syrup and in the juice of canned cucumbers. *Lebensmittel-Industrie* 27(8); 1980; 361-3 (German)

The acid content of various foodstuffs can be ascertained from the pH value with sufficient exactness. The relationship was proved by experimentally ascertained values and mathematical test methods. The following

dependence was determined in raspberry syrup: pH value = 3.9187 - 4.9187 1 g (acid content in percent). AA

ORANGE

1406 BHULLAR (JS), AGNIHOTRI (RP) and FARMAHAN (HL). Effect of various treatments on extending the post-harvest life of blood red fruits. *Indian J. Hortic.* 37(3); 1980; 250-54

Eleven different treatments were given to blood-red oranges viz:- wax (6 and 12%) benlate (250 and 500 ppm), 2,4-5-T (50 and 100 ppm), 2,4-D (50 and 100 ppm), 2,4-D (100 ppm) + wax (6%), 2,4-D (50 ppm) + wax (12%) and control. The physiological loss in weight was kept to the minimum by a 12% wax treatment; treatment with 6% wax was the next best in reducing the weight loss, closely followed by 2,4-D (100 ppm) + wax (6 per cent) and benalate (250 ppm). No significant effect was observed on TSS. Total and reducing sugars increased and titratable acidity decreased with increase of the storage period. KMD

APPLE

1407 TIKU (AK) and DAR (MA). Studies on effects of various doses of ethrel upon maturity and quality of Ambri Kashmiri apples (*Malus Sylvestris* Mill). *Indian J. Hortic.* 37(4); 1980; 348-54

Ethrel at doses of 500 ppm or 1000 ppm was sprayed on the apple trees 6,4, and 2 weeks prior to harvest. Spraying 6 or 4 weeks before harvest induced maximum detachment of fruits. Spraying at 500 ppm level, 6 or 4 weeks before harvest resulted in accelerated growth of the fruit, a higher acid content, and significantly better taste and flavour. The 1000 ppm dose sprayed on the same two dates resulted in maximum fruit softness, and also in the development of a yellow discolouration. Percentage of soluble solids was maximum when 500 ppm ethrel was sprayed 4 weeks before harvest. All the treatments resulted in increases in weight and volume regardless of application. KMD

1408 POLESELLO (A) and GORINI (F). Objective evaluation of the surface colour of apple fruits from cultivars of the red delicious group. *Confructa.* 25(1/2); 1980; 16-27

The evaluation of the colour difference data showed that, during the post-harvest ripening; apple cultivars poor in red pigments did not clearly change their original colour, while much stronger colour differences were registered for the intensely coloured cultivars. The objective evaluation of colour by instrumental measurement can serve to estimate the degree of ripeness of fruits for each cultivar of the red delicious group, as well as to estimate the rate of ripening. This way, it is possible to predict the optimum duration of storage and to select the slowest ripening cultivars. VR

CASHEW APPLE

1409 SONDHI (SP) and PRUTHI (JS). Effect of variety/strain and stage of maturity on the quality of cashew apples. *Indian J. Hortic.* 37(3); 1980; 270-75

No material difference were noted between the two types of red and

yellow cashew apples during development maturation and ripening, though considerable variation was noted in both of them in respect of several quality attributes like Brix, acidity, sugar and vitamin C. However, irrespective of the variety or strain, there was a gradual increase in fruit weight, moisture, Brix, Brix acid ratio and total sugars during maturation and ripening while, in general there was a gradual fall in acidity, apparent ascorbic acid, polyphenols (tannins) and N or protein content. VR

SUGAR, STARCH AND CONFECTIONERY

JAGGERY

1410 SINDE (BN), MARATHE (AB) and KADAM (SK). Effect of different wrapping material and disinfectants on keeping quality of jaggery. *Indian Sugar.* 31(9); 1981; 609-15

The main problems in packaging and storage of jaggery are running off of jaggery during rainy season and deterioration of colour during storage due to absorption of water and microbial attack. The various packaging materials tried are polyethylene, paper, jute grass and the disinfectants and paraformaldehyde density, sulphur dusting and dipping in 10% biphenyl. Polyethylene film wrapping helped, check the running off completely but it had no effect on darkening of colour. The wrapping with grass helped maintaining original jaggery colour. Disinfectants used with the wrapping did not help in checking microbial spoilage. MVG

HONEY

1411 SPORNS (P). High pressure liquid chromatographic determination of phenol in honey. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 337-9

An internal standard, 2-phenylethanol, was added to honey which was steam-distilled and chromatographed on a 25 cm x 3.2 mm id Spherisorb 5 µm silicic acid column using water as the mobile phase. Absorbance was monitored at 195 nm. Using a mixed standard of known concentration and peak height measurements, the amount of phenol in the honey could be quantitated. Recovery of added phenol was checked at levels from 0.1 to 33 ppm. AA

STARCH

1412 HESS (D). Drying of starch and flour in the spiral dryer. *Starch* 32(1); 1980; 8-11

1413 BARR (DJ). Energy saving in dryers for the starch industry. *Starch* 32(1); 1980; 5-7

1414 FRANK (E). Possibilities of energy saving in evaporation with industrial examples. *Starch.* 32(1); 1980; 1-4 (German)

1415 LAUER (K). Large scale production of fructose. *Starch.* 32(1); 1980; 11-3 (German)

An interesting sugar, of nutritional and physiological consideration is D-fructose (laevulose). Large-scale industrial production has been

carried out for many years from sucrose via the process known as the "calcium fructosate procedure". A major breakthrough was achieved when it became possible to carryout the separation of fructose and glucose by a chromatographic method using ion exchange resins. A report on the development of the technique and on the 10 year experience of an industrial plant is presented. AA

1416 VOSS (P). Preparation of methyl-β-D-fructopyranoside, methyl-α-D-fructofuranoside and methyl-β-D-fructofuranoside. *Starch.* 32(1); 1980; 24-7 (German)

1417 LASZLO (F), BANKY (B) and SZEJTLI (J). Comparison of production of cyclodextrin-transglycosylase enzyme from different *Bacillus macerans* strains. *Starch.* 32(1); 1980; 27-9

CONFECTIONERY

1418 FOX (H). New confectionery packaging in the USA. *Confect. Prod.* 47(2); 1981; 57

1419 MCLAREN (K). The importance of controlled lighting for colour matching. *Confect. Prod.* 47(2); 1981; 68-70

BAKERY PRODUCTS

1420 MALKKI (Y) and RAUHA (O). Mould inhibition by aerosols in the baking industry. *Ind. Aliment.* 20(180); 1981; 95-8 (Italian)

Aerosols may be able to reduce mould proliferation in baked products. Although propionic acid is the anti-septic agent used in the experiments conducted up till now, it is possible to use a wide range of antiseptic agents. Bread can be kept fresh for a longer period, and only minimum amounts of chemicals could be used. KMD

1421 SKEGGS (PK) and KINGSWOOD (K). Mechanical dough development : Pilot scale studies. *Cereal Chem.* 58(4); 1981; 256-60

It was observed that flour containing 11% protein gave the best loaves with the greatest tolerance to mixing variations in the pilot scale studies for mechanical dough development. BSN

BREAD

1422 WINKLER (A) and WASSERMANN (L). Sensory discrimination capability of consumers between rye breads produced by different methods. *Z. Lebensmittel-Unters. Forsch.* 170(2); 1980; 115-8

Rye breads produced by the sour dough method and by a straight dough process were evaluated in a triangle test by 72 persons in the age group from 18 to 65 years. The test demonstrated that consumers of this kind of bread cannot discriminate the taste between breads produced by these two methods. AA

1423 ISSHIKI (K), TSUMURA (S) and WATANABE (T). Gas chromatographic determination of propionic acid in bread and cake. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 280-1

A simple and accurate method is presented for gas-liquid chromatographic (GLC) determination of propionic acid in bakery products. Propionic acid is extracted with a mixture of dichloromethane and formic acid to which isobutyric acid has been added as an internal standard. The extract is injected directly into the GLC system. A glass column packed with 5% SP-1000 is used. The simplicity and convenience of the method make it suitable for routine determination. AA

CAKE

1424 CHAUDHARY (VK), YAMAZAKI (WT) and GOULD (WA). Relation of cultivar and flour particle size distribution to cake volume. *Cereal Chem.* 58(4); 1981; 314-7

MILK AND DAIRY PRODUCTS

1425 DAVIES (FL) and GASSON (MJ). Reviews of the progress of dairy science : Genetics of lactic acid bacteria. *J. Dairy Sci.* 48(2); 1981; 363-76

1426 STEINIGEN (E) and MATTHEE (A). Productive packaging plants for the dairy industry from the kombinat NAGEMA. *Lebensmittel-Industrie.* 27(8); 1980; 355-60 (German)

1427 DODEJA (AK), ZAIDI (AH) and SARMA (SC). Agitated thin film evaporators and their application in dairy processing. *Indian Dairyman.* 33(8); 1981; 505-7

The construction details of agitated thin film evaporator is diagramatically represented along with the heat and mass transfer details and its specific applications in dairy industry are discussed. MVG

1428 BHADANIA (AG), DAVE (HR) and SHAH (US). Operation of refrigeration plant with improved economy and saving of refrigeration in dairy plants. *Indian Dairyman.* 33(8); 1981; 485-90

Article covers management of refrigeration plant operations; efficient utilization of refrigeration; and management of process operations in milk and milk products. MVG

1429 INOUE (T), IWAIDA (M), ITO (Y) and TONOGAI (Y). Gas-liquid chromatographic detection and determination of diacetyl tartaric acid ester of diglyceride in dairy and nondairy coffee cream powder. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 276-9

MILK

1430 ANDERSON (M). Inhibition of lipolysis in bovine milk by proteose peptone. *J. Dairy Res.* 48(2); 1981; 247-52

1431 HORNE (DS) and PARKER (TG). Factors affecting the ethanol stability of bovine milk. I. Effect of serum phase components. *J. Dairy Res.* 48(2); 1981; 273-84

1432 HORNE (DS) and PARKER (TG). Factors affecting the ethanol stability of bovine milk. II. The origin of the pH transition. *J. Dairy Res.* 48(2); 1981; 285-91

1433 MIROCHA (CJ), PATHRE (SV) and ROBISON (TS). Comparative metabolism of zearalenone and transmission into bovine milk. *Food Cosmet. Toxicol.* 19(1); 1981; 25-30

1434 TRIEU-CUOT (P) and ADDEO (F). Occurrence of γ-caseins in buffalo milk. *J. Dairy Res.* 48(2); 1981; 311-7

1435 QURESHI (HA), DESHPANDE (KS) and BONDE (HS). Studies on chemical composition of goat milk. *Ind. Vet. J.* 58(3); 1981; 212-4

Average values for constituents on individual and herd goat milk samples were 4.70 and 4.71 per cent for fat; 8.52 and 8.61 per cent for solids-not-fat, 13.26 and 13.35 per cent for total solids; 3.78 and 3.84 per cent for total protein; 3.31 and 3.32 per cent for true proteins, 3.05 and 3.05 per cent for lactose; 0.81 and 0.79 per cent for ash; 1.031 and 1.031 per cent for specific gravity; 0.16 and 0.16 per cent for titratable acidity. The studies on the composition of goat milk revealed that the goat milk was almost comparable to the cow milk in general and was a good source of nutrients. AA

1436 SNOEREN (THM) and BOTH (P). Proteolysis during the storage of UHT-sterilized whole milk. 2. Experiments with milk heated by the indirect system for 4 s at 142 C. *Neth. Milk Dairy J.* 35(2); 1981; 113-9

Describes the results obtained with the indirect UHT process. When the milk proteinases were subjected to direct and indirect UHT processes, large differences could be observed; but when bacterial proteinases were treated, the differences were small. The addition of disodium phosphate or sodium hexa-metaphosphate (50 g/100kg) did not affect the enzymatic attack. The shelf life of the bad milk has been improved by applying the indirect process (80 days instead of 20 days). In good milk, the breakdown of casein by the indirect process is negligible. VR

1437 DRIESSEN (FM), VAN HOOYDONK (A), STREUPER (A) and KINGMA (F). Influence of native milk proteinase on the viscosity of UHT-sterilized custard during storage. *Neth. Milk Dairy J.* 35(2); 1981; 121-31

The viscosity of UHT-sterilized custard does not remain constant. During storage at 20 C the custard gradually becomes thinner. This phenomenon appears to coincide with proteolysis by the residual activity of native milk proteinase. This proteolysis causes not only a decrease of the viscosity but also a bitter taste and a glassy appearance. At the end of the storage period of sixteen weeks, gelation and destabilization of the product can occur. The custards prepared with holding times of 18 seconds and 36 seconds at 142 C remained stable. It is therefore recommended to pay attention to the inactivation of native milk proteinase during the manufacture of UHT-sterilized custards. It appeared that the milk protein plays an important role in the consistency of the custard. There were no indications of amylase activity in these experiments. AA

1438 Di GREGORIO (F) and SISTO (R). Milk coagulation by cationic polyelectrolytes. *J. Dairy Res.* 48(2); 1981; 267-71

1439 MUKHERJEE (S) and SANTI PALIT (R). Rapid volumetric determination of protein in milk. *Sci. Cult.* 47(6); 1981; 221

In this method milk (10 cc) is diluted to 250 cc and 10 cc of N/10 HCl is added to 25 cc of the aliquot, and titrated against 0.2% sodium dodecyl sulphate (SDS) solution (0.070 M). At the end point, the contents suddenly separate into a curd like white coagulum. The protein is estimated by using the following factors obtained by calibration against Kjeldahl method: 1 cc SDS solution = 8.4×10^{-3} g milk protein or % protein = Titre in cc $\times 8.4 \times 10^{-1} \pm 0.2$. MVG

1440 TUINSTRA (LGMTh), VREMAN (K), ROOS (AH) and KEUKENS (HJ). Excretion of certain chlorobiphenyls into the milk fat after oral administration. *Neth. Milk Dairy J.* 35(2); 1981; 147-57

The excretion of chlorobiphenyls (PCBs) into milk fat was determined during an experiment which lasted for eight weeks with cows early in lactation and fed at different levels. The accumulation factors (level in milk fat/level in feed on a dry matter basis) of several chlorobiphenyls are given. The factor for lower chlorinated biphenyls is comparable with the factor for organochlorine pesticides such as lindane (0.5), and that for higher chlorinated biphenyls is equal to the factor for hexachlorobenzene (5 4). The determination of individual chlorobiphenyls was achieved by analysing sample extracts by glass capillary chromatography and electron capture detection. AA

1441 PETTIPHER (GL) and RODRIGUES (UM). Rapid membrane filtration epifluorescent microscopic technique for the direct enumeration of somatic cells in fresh and formalin-preserved milk. *J. Dairy Res.* 48(2); 1981; 239-46

1442 YOSHIZAWA (T), MIROCHA (CJ), BEHRENS (JC) and SWANSON (SP). Metabolic fate of T-2 toxin in a lactating cow. *Food Cosmet. Toxicol.* 19(1); 1981; 31-9

1443 PESTKA (JJ), LI (Y), HARDER (WO) and CHU (FS). Comparison of radioimmunoassay and enzyme-linked immunosorbent assay for determining aflatoxin M_1 in milk. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 294-301

1444 BATISH (VK), GARG (SK), HARISH CHANDER and RANGANATHAN (B). Public health significance of milk borne intoxications. II. *E. coli, B. cereus, Streptococcus* and *Asperoillus*. *Indian Dairyman.* 33(8); 1981; 501-3

Nature and biological activity of the toxins produced by *Escherichia coli, Bacillus cereus, Streptococcus* and *Aspergillus* in milk and milk products and the preventive measures have been reviewed. MVG

1445 EL-GENDY (SM), NASSIB (T), ABED-EL-GELLEL and N-EL-HODA HANAFY. Survival and growth of *Clostridium* species in the presence of hydrogen peroxide. *J. Food Prot.* 43(6); 1980; 431-2,434

Some bacteria in the genus *Clostridium* can occur as contaminants in milk. If cheese is made from milk with such contaminants, the bacteria can cause the "late gas" or "late blowing" defect in the cheese. Since hydrogen peroxide can be used to treat milk for cheesemaking, this investigation was initiated to determine effects of the peroxide on viability and growth of *Clostridium tyrobutyricum* NIZO, *C. tyrobutyricum* 144, *Clostridium perfringens*. 115 and *Clostridium sporogenes* T9. Presence of 0.01% hydrogen peroxide in litmus milk retarded but did not prevent growth of and gas production by the clostridia. Presence of 0.02% peroxide inhibited growth and gas production when litmus milk contained, per milliliter, 50 or 100 spores of any of the clostridia studied. These numbers of clostridial spores are greater than those normally found in raw milk produced under ordinary conditions. AA

1446 DE BOER (R) and ROBBERTSEN (T). A purified hydrolysed lactose syrup made from ultrafiltration permeate. *Neth. Milk Dairy J.* 35(2); 1981; 95-111

An acid-hydrolysis, high-temperature system was developed, in which a specially constructed heat exchanger was used. By the described process, hydrolysis of deproteinized liquids, such as ultra-filtration (UF) permeate from cheese whey, can be carried out. The pH of the concentrated UF permeate of about 10% total solids was brought to pH 1.2 by means of a strong-acid cation exchange resin. A degree of hydrolysis of 80%, which can be determined quickly with an osmometer, was reached by heating the liquid at 150 C for 3 minutes. During hydrolysis a brown colour was formed, the intensity of which appeared to be dependent on the non-protein nitrogen content. Purification of the liquid took place in a weak-base anion resin, followed by a second pass through both resins mentioned (merry-go-round system). The best results were obtained when adsorbing ion-exchange resins were used, which remove not only salts but also brown colour and non-protein nitrogen. A final purification took place with 0.1% activated charcoal after concentration to about 62% total solids. The colourless syrup contained, besides carbohydrates, 0.1% ash and 0.024% nitrogen. Due to the use of the acid hydrolysis, high-temperature system, the specific hydrolysis costs are low. The total process costs are estimated at f 0.368 per kg syrup. AA

1447 DAEMEN (ALH). The destruction of enzymes and bacteria during the spray-drying of milk and whey. 1. The thermoresistance of some enzymes and bacteria in milk and whey with various total solids contents. *Neth. Milk Dairy J.* 35(2); 1981; 133-44

1448 DARLING (DF) and HOOYDONK (ACMV). Derivation of a mathematical model for the mechanism of casein micelle coagulation by rennet. *J. Dairy Res.* 48(2); 1981; 189-200

1449 MIRANDA (G) and PELISSIER (J-P). *In vivo* studies on the digestion of bovine caseins in the rat stomach. *J. Dairy Res.* 48(2); 1981; 319-26

WHEY

1450 MADRID VICENTE (A) and MADRID VICENTE (R). Proteic concentrate preparation through whey ultrafiltration. *Ind. Aliment.* 19(174); 1980; 579-84 (Italian)

CHEESE

1451 HEERTJE (I), BOSKAMP (MJ), KLEEF (F.Van) and GORTEMAKER (FH). The microstructure of processed cheese. *Neth. Milk Dairy J.* 35(2); 1981; 177-9

In the preparation of processed cheese, two distinct stages can be distinguished: a first stage in which casein micelles are broken down to sub-micelles or even sub-units and a second gelation stage in which a partial build-up of dissociated protein fragments, with formation of string-like structures takes place. VR

1452 ABD EL-SALAM (MH), EL-SHIBINY (S), MONEIB (A), ABO EL-HEIBA (A) and AL-KHAMY (A). Pickled soft cheese-making from recombined milk with added dried buttermilk. *J. Dairy Res.* 48(2); 1981; 327-31

Pickled soft cheese was made from recombined milk (30% total solids, 8% fat) containing buttermilk powder (0-4%) and stored in the pickle at

room temperature (25±5 C) for 135 days. The yield, quality and composition of cheese were followed periodically during storage. The addition of buttermilk slightly increased the yield and improved the flavour intensity of the cheese, whilst only slightly affecting its chemical composition. AA

1453 DEMOTT (BJ) and SANDERS (OG). Use of direct-acid-set cottage cheese whey to manufacture sherbet. *J. Food Prot.* 43(6); 1980; 433-4

Orange sherbet of 1% fat and 45 or 46% direct-acid-set cottage cheese whey were compared to a control sherbet containing no whey. The titratable acidity was higher in sherbets containing whey. An untrained taste panel found no difference between the three sherbets studied, describing them as "like moderately". AA

1454 SHARMA (HS), BASSETTE (R), MEHTA (RS) and DAYTON (AD). Yield and curd characteristics of cottage cheese made by the culture and direct-acid-set methods. *J. Food Prot.* 43(6); 1980; 441-6

Cottage cheese was made by the short-set culture and direct-acid-set methods, using three skim-milk protein concentrations: 3.1,3.5 and 3.9 + 0.1%. Highly significant differences were observed in the curd yield obtained by the two methods - the yield being about 5% higher by the direct-acid-set method at protein concentrations of 3.1 and 3.5%, and about 1% higher at a protein concentration of 3.9%. Curd firmness was not affected by the method of setting, but rather by the protein concentration, being significantly greater at the 3.1% level than at the others. Direct-acid-set curd was more uniform in size than the short-set-culture curd. It retained dressing better only when made from 3.1% protein skim-milk, and when 1.25 times the normal amount of dressing was used. KMD

1455 GREEN (ML), GLOVER (FA), SCURLOCK (EMW), MARSHALL (RJ) and HATFIELD (DS). Effect of use of milk concentrated by ultrafiltration on the manufacture and ripening of cheddar cheese. *J. Dairy Res.* 48(2); 1981; 333-41

Milks were prepared at 1.7- to 4-fold the initial concentration by combining skim-milk concentrated by ultrafiltration with cream, and used for Cheddar cheese-making. Starter growth was unaffected, but the increased buffering capacity in the more concentrated milks resulted in a slower decline in pH and a higher pH value in the cheese. Curd formation was faster despite the use of reduced amounts of rennet. With milk concentrated more than 2-fold, large amounts of fat were lost in the whey, so that the cheeses had less fat than normally. Fat losses may be partly related to the lower degree of aggregation of the casein micelles when the curd was cut. As the concentration factor of the milk increased, the rate of casein breakdown, the intensity of Cheddar flavour, and the levels of H_2S and methanethiol in the cheese decreased. These factors may relate to the reduced concentration of active rennet retained in the curd at pressing. AA

1456 GREEN (ML), TURVEY (A) and HOBBS (DG). Development of structure and texture in cheddar cheese. *J. Dairy Res.* 48(2); 1981; 343-55

MEAT AND POULTRY

1457 TRENNOLM (HL), WARNER (RM) and FARNWORTH (ER). High performance liquid chromatographic method using fluorescence detection for quantitative analysis of zearalenone and α-zearalenone in blood plasma. *J. Assoc. Off. Anal Chem.* 64(2); 1981; 302-10

1458 COMI (G) and CANTONI (C). Yeasts on bowel's surface - or superficial blastomycetic flora of raw, cured, and dehydrated meat products. *Ind. Aliment.* 19(174); 1980; 563-9 (Italian)

During sausage seasoning, some yeasts may proliferate, and after 8 days invade the entire surface of the casing. These so-called "flowers of sausages" consist mainly of *Debaromyces hansenii, Torulopsis candida,* and others. KMD

1459 SIMONETTI (P), CANTONI (C) and DORIGO (E). NO_2 production during dry salami seasoning. *Ind. Aliment.* 20(180); 1981; 99-100 (Italian)

NO_2 is produced, during the process of maturation of dry salami, by the action of bacteria on nitrates, which are reduced to nitrites which then decompose into nitrous acid and gaseous oxides in the acidic substrate of the paste. KMD

1460 FUCHS (G), JANSSON (S) and NORBERG (P). Investigation of the soft fraction from mechanical meat deboners. *Var Foda.* 32(2); 1980; 50-63

Seventy samples of the soft fraction (minced meat) obtained from three types of mechanical meat deboners (viz. Paoli, Beehive, and Protecon) were analysed for (a) bacterial quality, (b) nutritive value (i.e. water, protein, fat, ash, calcium, iron, fluoride, and connective tissue contents), and (c) content and size of bone residue. The count of aerobic bacteria and coliforms was low in beef, pork, and poultry meat. Staphylococci were found in 80% of the poultry meat samples, and were present at levels higher than the permissible limit (10^3) in 50% of the poultry meat samples. The latter were, therefore, considered unfit for human consumption. Products from mechanical deboners have a lower content of water, protein, and connective tissue, and a higher content of fat, ash, calcium, iron, and fluoride than conventional products. Bone particles larger than 0.5 x 0.5 mm were present in all the samples. The content of bone residue was between 1.8 and 5.3% (w/w). KMD

1461 TANAKA (N), TRAISMAN (E), LEE (MH), CASSENS (RG) and FOSTER (EM). Inhibition of botulinum toxin formation in bacon by acid development. *J. Food Prot.* 43(6); 1980; 450-57

It was found that (a) sodium nitrite alone, at 120 ppm, did not give bacon extended protection against development of botulinum toxin, if a fermentable carbon source (sucrose in these instances) was not present; (b) without added lactic acid bacteria, the effectiveness of 120 ppm of sodium nitrite plus sugar was variable and depended upon growth of naturally contaminating bacteria and (c) lactic acid bacteria with an adequate amount of sucrose gave good protection against development of botulinal toxin. Upon temperature abuse, acid was produced and growth of *C. botulinum* was inhibited. Because the protective properties against development of botulinal toxin in the sugar-lactic acid, bacteria system were not dependent on the presence of nitrite. Nitrite can be lowered to the level necessary to make organoleptically acceptable products without sacrificing safety. Thus, less nitrosamine formation may be achieved. AA

BEEF

1462 CIAPPELLANO (S), PORRINI (M), TESTOLIN (G) and CANTONI (C). Comparison of the "*in vitro*" proteolysis of beef, pork, horse-meat, and poultry meat. *Ind. Aliment.* 20(180); 1981; 101-3 (Italian)

The proteins of roasted and boiled meats were hydrolyzed with pepsin

(pH_2), and subsequently with pancreatin (pH 7.6). Horse meat was hydrolyzed by pepsin to a lesser extent than beef; after pancreatic hydrolysis, the values found for these two meats were similar. KMD

PORK

1463 JUL (M) and ZEUTHEN (P). Quality of pig meat for fresh consumption. *Progr. Food Nutr. Sci.* 4(6); 1980; 1-129

Discusses : quality of pig meat; measuring pig meat quality; production factors affecting pig meat quality; handling and distribution factors affecting pig meat quality; improving quality of pig meat; proposal for a code of practice for marketing a select grade of pig meat; organizational arrangements to assess and ensure the quality of the pig meat. BSN

1464 ANDREWS (C). Meat and soya. The quiet revolution. *Food Flavour. Ingred. Packag. Process.* 3(6); 1981; 14-5

Discusses: dispersion on a carrier, fully emulsified products; semiemulsified products; pork pies; and pastes and paties. BSN

1465 ROMITI (R), MAGNANI (U) and BARALDI (P). Sausage factory requirements and their relations with the technique of pork production. *Ind. Aliment.* 19(174); 1980; 570-78 (Italian)

CHICKEN

1466 CHOUDHARY (MR) and SAINI (SS). Problems associated with marketing of poultry and poultry products produced through small marginal farmers. *Poult. Guide.* 18(6); 1981; 57-62

The development of the poultry industry in India since 1960, and the current efforts to modernize the marketing of poultry products have been summarized. Export of eggs and the current systems of grading and selling of eggs in India and the recommendations for marketing of poultry and poultry products have been covered. KMD

1467 DESHRI (RC), SHYAMSUNDER (G) and SINGH (BP). Mechanically deboned poultry meat. *Poult. Guide.* 18(6); 1981; 33-4

A brief note on the principle and procedure of deboning poultry meat, the composition, colour, flavour, and microbiological quality of mechanically deboned poultry meat and its applications. KMD

1468 GHOSH (TK), MAITRA (DN) and SINHA (R). Body composition of Rhode Island Red hen by slaughter technique. *Indian J. Anim. Health.* 19(2); 1980; 155-7

Carcass quality of hen in respect of body weight, fat protein and ash was determined by direct slaughter technique. The average body weight was 2.065 ± 0.229 kg, but the carcass weight after evisceration was 69.25 ± 1.26% of live weight. The average water, protein, fat and ash contents were 55.10 ± 0.54, 17.90 ± 0.62, 20.10 ± 0.72 and 7.00 ± 0.55% respectively on the basis of eviscerated carcass weight. Highly significant ($P < 0.1$) negative correlation ($r = -0.9$) was obtained with moisture and fat. The correlation between moisture and protein was non significant ($r = 0.35$). MVG

1469 RAJASEKARAN (P). Effect of fish and chicken wastes on the microbial population and biogas generation. *Madras Agric. J.* 68(7); 1981; 444-9

Chicken waste (intestine along with its contents and unwanted skin) and fish waste (intestine, skin scrapings and caudal fin) were mixed with cattle dung and used for biogas production. Equal quantities of cattle dung and water were mixed with old slurry and fish and chicken waste in the ratio 4:1:1. Experiment conducted for 12 weeks indicated that maximum output of gas (1088 cc/day) was obtained with fish waste than with chicken waste (899 cc/day). MVG

1470 VERSTRATE (JA), SPENCER (JV), MIROSH (LW) and BECKER (WA). A comparison of methods for determining the fat content of broiler carcasses. *Poult. Sci.* 59(2); 1980; 298-302

The mean fat content as determined by the Banco fat test was 1.5% to 1.7% less than the ether extractable solids content determined by Goldfisch fat extraction. Although the Banco method gave smaller values, it had the advantage of less variation between triplicate samples (i.e., greater precision). Correlations between the Banco and ether extraction methods were high (r = .89 to .95). Moisture had a high negative correlation (r = -.87 to -.90) with ether extractable solids content of the ground broiler carcasses. Linear regression equations were calculated for the prediction of ether extractable solids content from the percentage fat determined by the Banco trst or calculated from moisture content. A comparison of the methods by cost, time involved, accuracy, and precision suggests that the Banco method is a feasible choice for a laboratory which must determine fat content of a large number of meat samples in a minimum amount of time. AA

1471 LIN (CY). Relationship between increased body weight and fat deposition in broilers. *World Poult. Sci. J.* 37(2); 1981; 106-10

1472 PANDEY (NK), MAHAPATRA (CM) and SUSHIL KUMAR. Value of chicken from nutritional standpoint. *Poult. Guide.* 18(6); 1981; 27-32

The proximate composition, amino acids, lipid, phospholipid, neutral lipid, cholesterol, sugar, vitamin and mineral contents of light and dark chicken meat have been reported in 7 tables. Chicken meat is recommended as a low energy food, as it is good for longevity. KMD

1473 CHEN (SCG), WEI (RD) and HSIEH (DPH). Purification and some properties of chicken-liver aflatoxin B_1 reductase. *Food Cosmet. Toxicol.* 19(1); 1981; 19-24

1474 RIGBY (CE) and PETTIT (JR). Delayed secondary enrichment for the isolation of salmonellae from broiler chickens and their environment. *Appl. Environ. Microbiol.* 40(4); 1980; 783-6

1475 THAKUR (BS), VERMA (SVS) and PANDA (B). Nutritional value of damaged maize and damaged wheat for broilers. *Indian Poult. Gaz.* 64(4); 1980; 128-31

As much as 60% of the normal maize in broiler diets was replaced by damaged maize or damaged wheat. The broilers grew equally well on the experimental and control diets. The diets containing damaged grains, however, had lower values of metabolizable energy. The presence of uric acid in the diets based on damaged grains had no effect on energy utilization by the chicks, but did affect nitrogen retention adversely. No mortality, or any sign of nutritional deficiency, was observed during the experiment. KMD

1476 THAKUR (BS), VERMA (SVS) and PANDA (B). A note on the metabolizable energy of damaged maize and damaged wheat for broilers. *Indian Poult. Gaz.* 64(4) 1980; 132-4

Damaged maize and damaged wheat proved to be good sources of metabolizable energy - 3225 and 3157 kcal/kg dry matter, respectively - when fed to 3-week-old broilers at 40 and 60% levels in a practical diet, containing chromic oxide as an indigestible marker. The level of inclusion had no appreciable effect on their metabolizable energy values. KMD

1477 MATHUR (CR), REDDY (CV) and RAMANA RAO (NV). Utilization of *Cassia tora* (chirout) seed meal in chick diets. *Indian Poult. Gaz.* 64(4); 1980; 146-8

The seed meal of *Cassia tora* (or chirout), a weed that grows abundantly in the waste lands and forests of India, was incorporated at 3,6,9 and 12% levels in the diet of chicks during the first 8 weeks of their life. There were no significant differences in the body weight gain in the chicks fed on the different diets, nor any in the feed efficiency of the diets. However, feed efficiency did appear to be poor, when the diet contained 12% of chirout seed meal. Mortality was low in all the groups. Hence, chirout seed meal can be included in chick rations upto a level of 12%. KMD

TURKEY

1478 MOLONON (BR), BOWERS (JA) and DAYTON (AD). Vitamin B_{12} and folic acid content of raw and cooked turkey muscle. *Poult. Sci.* 59(2); 1980; 303-7

Raw and cooked turkey pectoralis major muscle was assayed for vitamin B_{12} and folic acid. Total cooking loss was greater for meat roasted at 93 C than for other cooking treatments. Moisture content of raw meat was higher than for cooked and braised meat contained more moisture than roasted meat. Meat roasted at 93 C had more vitamin B_{12} on an edible weight basis than when roasted at 177 C. On a moisture-free and fat-free basis, meat cooked at 177 C had less vitamin B_{12} than raw meat and that cooked at 93 C. Folic acid content was not affected by the cooking treatment. AA

EGG

1479 SAUTER (EA) and PETERSEN (CF). Omelets from pasteurized frozen whole egg by use of fresh, freeze-dried, or spray-dried egg white. *Poult. Sci.* 59(2); 1980; 293-7

Pasteurized frozen whole egg (PWE) was evaluated for use as the principle ingredient of omelets. Three types of omelets were used in the evaluation: plain, utilizing beaten whole egg; puffy, normally prepared with yolks and whites whipped separately; and 10 min. omelets prepared similarly to puffy omelets except that 40g of flour was added. Sensory evaluation compared omelets made from PWE and reference omelets made from fresh eggs for acceptability, colour, flavour, moistness, and tenderness. Scoring was from 0 to 6 with reference equal to 4.0. Colour of plain omelets made from PWE was significantly darker than the reference omelets. Acceptability and other sensory factors of puffy and 10 minutes omelets made from PWE were not significantly different than comparable reference omelets when 17.3% of the pasteurized or fresh whole egg was replaced with fresh egg white or reconstituted freeze-dried egg white for leavening. Reconstituted spray-dried egg white required substitution of 23.1% of the PWE to produce puffy or 10-minute omelets which were equal to reference omelets. AA

1480 MOATS (WA). Classification of bacteria from commercial egg washers and washed and unwashed eggs. *Appl. Environ. Microbiol.* 40(4); 1980; 710-14

Unwashed eggs contained a high amounts of gram positive cocci (71%), which included *Streptococcus faecalis* Aerococcus and *Escherichia coli* which were not, however, isolated from equipment surfaces and wash waters. Higher proportion of actinomycetes was observed on equipment surfaces than on unwashed eggs. Predominant gram negative rods present were *Alcaligenes* and *moraxella*, which were not,however, found in unwashed eggs. In rotting shells of eggs, *Flavabacterium* and *Alcaligenes* were involved. BSN

1481 QAYYUM (SA), SIDDIQUI (SM), MAHENDRANATH (D) and SREENIVAS REDDY (M). Quality and microbiological condition of shell eggs marketed in metropolitan Hyderabad. *Indian Poult. Gaz.* 64(4); 1980; 135-41

The quality of shell eggs marketed in Hyderabad was studied at four different levels, viz:- (i) producer, (ii) assembler, (iii) wholesaler, and (iv) retailer. Egg weight decreased while air-cell height increased as the eggs moved from (i) to (iv). The percentage of dirty eggs increased from 4.16 to 20.83%, and of cracked eggs from 4.16 to 12.5%, when eggs moved from (i) to (iv). Shell thickness proved to be independent of the market channel. Internal quality (albumen and yolk indices, Haugh units) also deteriorated from (i) to (iv), declining significantly at level (ii), and substantially at (iii) and (iv). The external microbial load varied from 1800 to 920,000 per shell and 0-37,000/g of egg contents, and it increased from (i) to (iv). The recovery of Corynebacterium from the shell surface and contents was an unusual finding. KMD

1482 BAKER (RC), GOFF (JP) and TIMONEY (JF). Prevalence of salmonellae on eggs from poultry farms in New York State. *Poult. Sci.* 59(2); 1980; 289-92

The purpose of this study was to determine the prevalence of salmonellae on egg shells. One hundred eggs from each of 14 Central New York poultry farms were tested for salmonella contamination of the shell. The egg magma was examined in those eggs that were positive on shell culture. Only 21% or three of the egg shells yielded salmonellae, all three of which were identified as *S. typhimurium*. No salmonellae were found in the magma of these eggs. Feed samples from 12 farms were also negative for salmonellae. From this study, it would appear that the incidence of salmonellae on eggs from Central New York poultry farms is very low. AA

SEAFOODS

1483 DATTA (SN). Fish/rice co-existence. *Seafood Export J.* 13(5); 1981; 9-16

The author has outlined the methods that have to be followed in India to obtain a fish crop from a paddy field. KMD

1484 HAMPTON (N). Fish processing: Past, present and future. *Food Flavour. Ingred. Packag. Process.* 3(5); 1981; 21-2

1485 CHAKRABORTY (PK). Dehydration of fish and its scope of commercial exploitation in India. *Seafood Export J.* 13(6); 1981; 9-19

About 21% of the present catch (1.3 mill t) of marine fish in India is salt cured and sun-dried. Modern methods of fishing are expected to quadruple the catch of marine fish in the next few years. Hence, an appropriate technology must be adopted to handle such a large catch. The author believes that dehydration is the only feasible solution at present, and he has

presented three possible schemes for the dehydration of fish:- artificial drying in a tunnel dryer; modern, commercial, fish-drying yards using a raised, concrete platform; and small, artificial or solar dryers for the artisan fisherman. KMD

1486 KALYANI (M). Sugars linked with fish scale protein. *Indian J. Fish.* 26 (1&2); 1979; 228-9

Besides mineral matter, fish scales contain two distinct proteins, collagen and ichthylepidin. Some carbohydrate are bound with the proteins of the scales; they include the neutral sugars, glucose and galactose, and the compounds, hexosamine and uronic acid, all of which are bound to ichthylepidin. MVG

1487 BURNS (BG), MUSIAL (CJ) and UTHE (JF). Novel cleanup method for quantitative gas chromatographic determination of grace amounts of di-2 ethylhexyl phthalate in fish lipid. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 282-6

A new, simple, and rapid cleanup procedure is described for di-2-ethylhexyl phthalate (DEHP) residues in fish lipids. Extracts are chromatographed on small alumina sulphuric acid-impregnated alumina (layered) columns after gel permeation chromatography of the fish lipid extracts on BioBeads SX-3. Quantitative analysis were carried out by electron capture gas chromatography using 2 columns. Spiked DEHP recoveries varied from 79.3% in mackerel to 86.1% in herring. DEHP concentrations were determined in plaice, eel, redfish, herring, cod, and mackerel tissues and ranged from trace (< 0.001 µg/g) to approximately 10 µg/g (wet weight basis). Ethanolic KOH saponification of the purified DEHP fraction, resulting in the disappearance of the DEHP peak, was used as a confirmatory test. Limited studies with dibutyl, di-n-heptyl, and diethyl phthalates suggest that the method can be made more versatile. AA

1488 RAO (DMR). Improved cleanup technique for estimation of endosulphan residues from fish tissues under tropical conditions. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 340-42

A new solvent system, 1% and 2% acetone in hexane, was developed for chromatography on partially inactivated florisil to facilitate the separation of isomers of endosulphan and its metabolites from fish tissues under tropical conditions. By using the colorimetric method of Maitlen et al. (1963), the minimum detectable limit for each isomer of endosulphan in various fish tissues is 5 µg. With this solvent system, the 2 isomers present in the technical material can be separated, so their toxicity to fish can be assessed separately. AA

1489 APPA RAO (T). Sodium and potassium content of some clupeoids of Waltair coast. *Indian J. Fish.* 25(1&2); 1978; 262-5

The Na content in three *Stolephorus* species ranged from 39-85 mg/100g and the K - content from 203-443 mg/100g. In three species of *Thyssa* (anchovies) the ranges were : Na 35-88 mg/100g and K 207-429 mg/100g. In two species of *Sardinella* (sardines) the ranges were: Na 40-85 mg/100g and K 225-445 mg/100g. KMD

SHARK

1490 TAGUCHI (M), TAKAGI (H), IWASHIMA (K) and YAMAGATA (N). Metal content of shark muscle powder biological reference material. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 260-64

SARDINE

1491 JOSHI (VR) and SARALAYA (KV). Studies on the effect of precooking in fish (*Sardinella longiceps*) canning. II. On major chemical components. *Mysore J. Agric. Sci.* 15(1); 1981; 142-50

The extent of nutrient lost in precooked canned fish is dependent on degree of heat penetration and temperature of cooking and the can size. This was assessed by measuring the loss of chemical constituents in relation to total weight loss. It was found that generally, moisture and fat decreased from 62-67 and 10-16% in raw fish to 58-59% and to 9.70-11.9% in cooked fish respectively. The protein content increased from 19.0-20.0% to 23-25.5%. Expressed as percentage of packed fish, the moisture losses were found to be higher than that of fat and protein. With high temperature larger can size and longer precooking, the losses were higher, but temperature and can size had much lesser effect with fat and protein than with moisture. The loss of caloric value due to precooking was found to be 25%. However, the final product had slightly higher caloric value than raw fish due to reabsorption of filling oil by the fish. KAR

CATFISH

1492 DAN (SS) and MOJUMDER (P). Length-weight relationship in catfish *Tachysurus tenuispinis* (Day). *Indian J. Fish.* 25(1&2); 1978; 23-8

Catfish were caught in two zones, off Vishakapatnam and off false point, and their length and weight were recorded. A single equation correlating these two variables could be established for both the sexes and both the zones, viz. Log W = -4.7347 + 2.8860 Log L or the parabolic equation $W = 0.00001842. L^{2.886}$ KMD

EEL

1493 SENESI (E), TORREGGIANI (D), BERTOLO (G) and CASERIO (G). Researches on new products of smoked eels. *Ind. Aliment.* 20(180);1981; 107-11 (Italian)

Canned smoked eels retain their organoleptic properties for 12 months at 4 C, and for 5 months at room temperature, even if the sterilization did not destroy all spores completely. A filling of fish gelatine produced good results. Products stored at 4 C, without any thermal treatment have a maximum shelf life of 30 days. KMD

MACKEREL

1494 PRABHU (RM), SARALAYA (KV) and NAGARAJ (AS). Canning of smoked mackerels. I. Standardisation of canning methods. *Mysore J. Agric. Sci.* 15(1); 1981; 113-19

Smoke cured mackerels (*Rastrelliger kanagurta*) were canned in (i) full size, (ii) half size and as (iii) fillets, to enhance the palatability and storage life and the process standardised. The important steps included: brining of fresh fish in a saturated solution of common salt, smoking in a locally designed smoking chamber using saw dust and wood shavings, precooking and thermal processing in autoclaves and packing in a medium of refined groundnut oil. The can sizes used were No.1 tall, 8-oz and quarter dinglay. The canned product was evaluated for quality based on physico-chemical analysis and taste panel, and was found acceptable. The optimum

conditions of brining time (minimum), smoking time at 55+5 C (minimum) and precooking time at 100 C (minimum) were 15,19 and 20 for (i), 10,60 and 20 for (ii) and 5,6 and 20 for (iii) respectively. MVG

PRAWN

1495 CHAKRABARTI (NM). Fishery and culture possibilities of estuarine prawns in Sundarban, West Bengal. *Seafood Export J.* 13(5); 1981; 17-23

The prawn species suitable for culture in the Sundarbans are (i) tiger shrimp (Penaeus monodon), (ii) Indian white prawn (Penaeus indicus), (iii) Indian pink prawn (*Metapenaeus monoceros*), (iv) yellow prawn (*Metapenaeus brevicornic*), and (v) *Palaeman styliferus*. An animal yield of 100 kg prawns/ha can be obtained. The economics of a commercial brackish-water prawn farm (of 5 ha) have been reported. MVG

1496 SRINIVASA GOPAL (TK), RAMACHANDRAN NAIR (KG), THANKAPPAN (TK) and GOVINDAN (TK). Improvements in functional properties of fish packagings by chitosan coating. *Perfectpac.* 21(8-9); 1981; 5-8

The effects of coating corrugated fibre-board, used for the packing of frozen prawns, with chitosan (at levels of 2% and 3%) improved the puncture resistance, bursting strength, tensile strength, and teasing strength of duplex board, it was superior to wax coating in all these aspects, but slightly inferior to wax coating only in water proofness (Cobb valve). Corrugated fibre-board prepared from kraft-paper when coated with chitosan proves better. Chitosan treated kraft paper is much cheaper than glassine paper, but equal to the latter in grease resistance; it can be used for the packing and storage of butter. KMD

1497 HEBBAR (KS) and HIREMATH (GG). Studies on prevention of drip loss in frozen prawn (*Metapenaeus dobsoni*). I. Use of additives. *Mysore J. Agric. Sei.* 15(1); 1981; 97-107

Effect of different additive itreatments other than polyphosphates on the prevention of drip loss in frozen prawn (*Metapenaeus dobsoni*) was investigated. The additives used were chilled water as contfol and solutions of 0.2% sodium citrate 1% propylene glycol, 0.35% sodium ascorbate + citric acid (2:5:1 ratio), 2% glycerol and 1% sodium bicarbonate. After treatment, the fresh meat was quick frozen in a contact plate freezer, packed in polyethylene pouches and stored at -20 C in carton boxes. Frozen prawn was evaluated for quality at monthly intervals by proximate analysis and sensory teasting by trained panel. Among the different treatments, 1% sodium bicarbonate (pH maintained at 7.5-7.9) was found to be most effective in reducing drip loss and retention of water holding capacity. The frozen prawns were acceptable in taste and texture even after six months torage at -20 C. KAR

1498 RAMAMURTHY (S) and MANICKARAJA(M). Relation between tail and total lengths and total and carapace lengths for three commercial species of penaeid prawns of India. *Indian J. Fish.* 25(1&2); 1978; 233-6

Linear relationships was observed between the tail length and total length or carapace length in three species of Indian prawns (both male and female), viz: *Metapenaeus dobsoni*, *Metapenaeus affinis* and *Prapeneopsis stylifera*. MVG

CRAB

1499 AMEER HAMSA (KMS). Chemical composition of the swimming crab *Portunus Pelagicus* Linnaeus. *Indian J. Fish.* 25(1&2);.1978; 271-3

The whole male crab on an average contained 68.64% moisture, 13.18% ash, 0.69% fat, and 14.55% protein; while that of female crab it was 71.70% moisture, 13.62% ash, 0.34% fat, and 10.34% protein. The average composition of the edible meat of male crabs was: 79.87% moisture, 1.84% ash, 0.15% fat, and 19.27% protein; while that of female crabs was 83.25% moisture, 1.35% ash, 0.16% fat, and 16.19% protein. KMD.

1500 AMEER HAMSA (KMS). On the meat content of *Portunus pelagicus* with some observations on lunar periodicity in relation to abundance, weight and moulting. *Indian J. Fish.* 25(1&2); 1978; 165-70

The meat content of male crabs (*Portunus pelagicus*) was more (24.59-32.46%) than female carbs (22.30-25.04%). Crab catches were relatively better during the new moon phase than during the full moon phase. The variation in weight at the two moon phases was much less. Recently moulted crabs were more frequent during the new moon phase. MVG

SHRIMP

1501 SWARTZENTRUBER (A), SCHWAB (AH), DURAN (AP), WENTZ (BA) and READ (RB) Jr. Microbiological quality of frozen shrimp and lobster tail in the retail market. *Appl. Environ. Microbiol.* 40(4); 1980; 765-9

The microbiological quality of three frozen shrimp products and frozen lobster tail at the retail level was determined. The number of retail units of the four products examined and the geometric means for aerobic plate counts at 30 and 35 C respectively, were: 1,464 units of cooked, peeled shrimp - 13,000 and 7,200 per g; 1,468 units of raw, peeled shrimp - 860,000 and 300,000 per g; 1,300 units of raw, in-shell shrimp - 800,000 and 300,000 per g; 1,315 units of lobster tail - 140,000 and 42,000 per g. Geometric means for coliform, *Escherichia coli*, and *Staphylococcus aureus* counts for all products were <10 per g. AA

OYSTER

1502 NAGABHUSHANAM (R) and BIDARKAR (DS). Studies on seasonal changes in the biochemical constituents of the oyster *Crassostrea cucullata*. *Indian J. Fish.* 25(1&2); 1978; 156-64

Studies over a period of one year revealed that water content varied from 75.06 to 85.47%, and was correlated to change in salinity of the estuarine water. Glycogen content varied from 21.45 to 45.03%, it fell during spawning, and rose again with gametogenesis. Fat content varied from 4.33 to 11.25%, the higher values being noted during May-June, just prior to spawning, after spawning there was a marked fall in fat content. Protein content varied from 52.30 to 70.00%, and was higher during the spawning period. MVG

PROTEIN FOODS

1503 FANTOZZI (P). Non-conventional vegetable proteins. 1. Economic and nutritional aspects: sources of supply. 2. Composition of sources and general trends of industrial utilization. 3. Protein extraction and purification technology. *Ind. Aliment.* 19; 1980; 205-13,331-6,415-21 (Italian)

FRUIT JUICES AND BEVERAGES

ORANGE JUICE

1504 MASSAIOLI (D) and HADDAD (PR). Stability of the vitamin C content of commercial orange juice. *Food Technol. Aust.* 33(3); 1981; 136-8

Seven brands of orange juice have been analysed for their ascorbic acid content over a 14-day period during which they were handled under conditions similar to the home. The ascorbic acid content was found to decrease slightly during storage, with the loss of ascorbic acid being dependent on the handling method used. Six of the brands tested contained sufficient ascorbic acid at the end of the study to approximately meet the minimum requirements for unopened juice. AA

TEA

1505 LIM (FF). Extraction of light filth from tea: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 287-90

The method consists of the following steps: sample preparation, wet sieving, dilution with 40% isopropanol, extraction with Tween 80-Na_4EDTA-40% isopropanol, flotation with mineral oil-heptane, and trapping off in a Wildman trap flask, in an interlaboratory collaborative study, analysts reported combined insect fragment recoveries of 99.2% for the proposed method and 93.0% for the AOAC method; the same analysts recorded combined rodent hair recoveries of 92.2% for the proposed method and 47.6% for the official method. Average times for reading individual subsamples were 9 minutes for the proposed method and 27 minutes for the AOAC method. The proposed method has been adopted official first action. AA

WINE

1506 CRESSWELL (KJ) and ESCHENBRUCH (R). The variation in magnesium levels of some experimental grapes, grape juices and wines. *Food Technol. NZ.* 16(1); 1981; 37-43

Magnesium concentration in white wines from New Zealand averaged 75.4 mg/1, with a range from 52-122 mg/1, However, for red wines the range was 56-130 mg/1, with the average of 89.7 mg/1. BSN

1507 TIMBERLAKE (CF). Parameters of red wine quality. *Food Technol. Aust.* 33(3); 1981; 139,140,142,144

The colour of red wine is considered in relation to recent findings in anthocyanin chemistry. Colour can be equated to $\ell_\alpha C_t \varepsilon_m$ where α is the ratio of the colour at wine pH to the total available colour (at pH <0.5), C_t is

the total pigment concentration, ε_m is the mean extinction coefficient of the pigmented species and ℓ is the depth of liquid being viewed. The variable effect of pH on α can be eliminated by development of the concept of a wine 'colouration' constant enabling wine colours to be compared at an arbitrarily chosen pH of 3.5. Its use reveals the operation of effects such as co-pigmentation and is of value in aiding the interpretation of colour measurements. The advantages of more sophisticated colour measurements using tri-stimulus values are stressed, particularly for assessing 'hue'. Factors affecting red wine colour and quality are reviewed - such as the contents of pigments, sulphur dioxide and acetaldehyde. Evidence is presented that sulphur dioxide adversely affects red wine quality, whereas controlled amounts of free acetaldehyde could be advantageous with some wines. AA

1508 VAN DAM (TGJ), ESHENBRUCH (RE) and KITCHEN (DJ). An evaluation of New Zealand bentonite for winemaking. *Food Technol. NZ.* 16(3); 1981; 22-5

BEER

1509 ACKMANN (A). Problems of the need based supply of the brewing and malting industry with standard brewing barley. *Lebensmittel-Industrie.* 27(8); 1980; 351-4 (German)

ALCOHOL

1510 ANON. Alcohol: Losing consciousness. *Econ. Scene.* 6(12); 1981; 32-3

1511 MOULIN (G), LAHAM-GUILLAUME (M) and GALZY (P). Study of alcohol production from deproteinated lacto-serum. *Ind. Alim. Agric.* 97(5); 1980; 471-4 (French).

Alcohol has been produced from deproteinated whey, or ultra-filtration permeate, by a batch process. The cost of production is so low that whey alcohol can compete even with synthetic alcohol. The alcohol is fit for use only as a solvent or reagent, and not as a beverage. KMD

OILS AND FATS

1512 BITNER (E), MOUNTS (TL) and DUTTON (HJ). Monitoring of oil composition by an automated system for esterification. GC analysis. *J. Am. Oil Chem. Soc.* 50(7); 1980; 209-15

An automatic system for transesterification of fats and oils was developed and coupled with an auto-injector type gas chromatograph. Using a timer sequencer electronic valving for sample and reactant solution introduction and appropriate pumps, and a real time computer, the system permits programmed monitoring of vegetable oil for fatty acid composition. The system can be used with batch or continuous reactors to determine the progress of composition modification and in processing streams to confirm uniformity of incoming stocks or finished products. AA

1513 EUGSTER (KE), SKURA (BJ) and POWRIE (WD). Rapid method for detection and quantitation of lipid soils on food contact surfaces: Evaluation of a model system. *J. Food Prot.* 43(6); 1980; 447-9,464

1514 PHILLIPS (JC), TOPP (C) and GANGOLLI (SD). Studies on the metabolism of calcium stearoyl-2-lactylate in the rat, mouse, guinea-pig and man. *Food Cosmet. Toxicol.* 19(1); 1981; 7-11

These studies suggest that the biological fate of calcium stearoyl-2-lactylate (CSL) is similar in all the species investigated and that the compound is unlikely to present a hazard to man in terms of its metabolic fate. BSN

1515 NEFF (WE) and FRANKEL (EN). Quantitative analysis of hydroxystearate isomers from hydroperoxides by high pressure liquid chromatography of autoxidized and photosensitized-oxidized fatty esters. *Lipids.* 15(8); 1980; 587-90

1516 POGHOSSIAN (GG) and NALBANDYAN (RM). The removal of peroxides from phosphatidylcholine preparations. *Lipids.* 15(8); 1980; 591-3

1517 GUPTA (MN) and WOLD (F). A convenient spectrophotometric assay for phospholipase D using p-nitrophenyl-phosphocholine-as substrate. *Lipids.* 15(8); 1980; 594-6

SPICES AND CONDIMENTS

CHILLI

1518 RAJPOOT (NC) and GOVINDARAJAN (VS). Paper chromatographic determination of total capsaicinoids in capsicums and their oleoresins with precision, reproducibility, and validation through correlation with pungency in scoville units. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 311-8

Total capsaicinoids is an important quality index of capsicums. It has been recommended that this index can be reliably estimated by a simple and rapid paper chromatographic method. Details of the method have been critically studied to establish the precision and reproducibility. The repeatability and reproducibility of the method were ±3.12% and ±6.63% (relative to mean), respectively. In addition, the values by this method for samples of capsicums and their oleoresins, varying over a wide range of capsaicinoids content, were validated by a high correlation ($r \simeq 1$) to pungency values by the standardized threshold dilution method . In light of the results presented,it is suggested that the total capsaicinoids by accepted as an index of pungency. AA

CUMIN

1519 BOSE (B), GHOSH (C) and SINGH (RP). Study on the chemical constituents of seeds of *Nigella Sativa* (Kalajira). A preliminary note. *J. Inst. Chem.* (India) 53; 1981; 273

Nigella sativa (black cumin) seeds, contain esters of unsaturated fatty acids, dehydrostearic acid, and linoleic acid with C_{15} and higher terpenoid and aliphatic alcohols. An α,β-unsaturated hydroxyketone $C_{15}H_{28}O_{41}$ having some antifedant properties, has been isolated. An alkaloid of the pyridine group is also present in a small amount. The fatty oil is reported to be edible and the alcoholic extract of the seeds is used for stabilizing edible fats. KMD

CARDAMOM

1520 IQBAL (BA). Cardamom: The 'Queen of spices'. *East. Econ.* 77(2); 1981; 76-9

NUTMEG

1521 JOSEPH (J). The nutmeg. Its botany, agronomy, production, composition and uses. *J. Plant. Crops.* 8(2); 1980; 61-72

Discusses: history, origin; distribution; taxonomy; phylogeny; botanical description; cultivation practices; breeding; sex inheritance; vegetative propagation; production statistics; trade; chemical composition; and uses. BSN

SENSORY EVALUATION

1522 VERNIN (G). Recent progress in food aromas: The role of heterocyclic compounds. *Ind. Alim. Agric.* 97(5); 1980; 433-49 (French)

Heterocyclic compounds are very widely distributed in our food: in cooked, boiled, or roasted foodstuffs as well as in fruits, alcoholic and non-alcoholic beverages, milk products, and tobacco. They are found principally among the aroma compounds. They are formed mostly by non-enzymatic browning (Maillard) reactions between reducing sugars and aminoacids or peptides. The various steps of this reaction have been described briefly. KMD

1523 JAUBERT (J-N). Aromas and aromatizing agents. *Ind. Alim. Agric.* 97(5); 1980; 453-6 (French)

The author has defined the terms "flavour" and "essences" and has shown their complementary properties. The importance of both economic and technological growth in this sector has been pointed out, and some recommendations are made concerning the use of essences. KMD

FOOD STORAGE

1524 GREIG (D). Investigation in primary grain storage. Is there a payback? *Prog. Food Nutr. Sci.* 4(3-4); 1980; 103-10

The article covers storage, requirements for emergency storage, permanent storage, peak storage and type of storages, live bagged storage, bulk storage including large silos, small silos, flat bulk stores and special structures. Reserve storage, farm and village level storage and storage costs have also been covered. KAR

1525 HINTON (WL). The economics of fruit and vegetable conservation. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 111-21

The author discusses the recent developments in UK and in EEC and deals with the various aspects of vegetable conservation including the economic aspects. KAR

1526 WEYMES (H). Psychological, educational, ethnic, religious constraints on crop conservation. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 127-30

1527 HERZKA (A) Ed. Post-harvest food crop conservation. Proceedings of a symposium, organised by the Association of Consulting Scientists, held in Harrogate, England, November 1979. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 1-138

1528 SINGER (DD). Post-harvest food losses. World overview. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 3-9
Food losses occurring in a few countries with particular reference to USA has been reviewed. KAR

1529 RHODES (MJC). The physiological basis for the conservation of food crops. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 11-20
The review covers physiological changes occurring in food crops after harvest including senescence, ripening, dormancy, and compositional changes during storage. Other aspects covered include physical factors such as temperature, moisture and storage atmosphere composition and pressure influencing the storage behaviour and physical and chemical treatments applied before or during storage. KAR

1530 DRYSDALE (AD). Chemical preservation of stored agricultural crops. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 97-102
Mainly deals with the preservation of moist grain using chemicals. KAR

1531 RASTOVSKI (A). Humidity control in stores for food crops. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 55-60

1532 TINDALL (HD) and PROCTOR (FJ). Loss prevention of horticultural crops in the tropics. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 25-39
Identification and estimation of losses including the nutritive value of horticultural crops, causes of loss in perishable commodities including physiological, mechanical and disease and pest infestation and the different conservation techniques such as cultural practices, breeding and selection, harvesting and handling, curing, transport and packing, storage structures including cool storage, chemical treatments, modified atmosphere storage and use of growth regulators are discussed. KAR

1533 BARTLETT (D). Practical temperature control and cooling methods in relation to crop preservation. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 47-53
This paper deals principally with practical cooling methods such as hydrocooling, vacuum cooling, air cooling and hydrair cooling. KAR

1534 STOTT (ANB). The role of radiation treatment in crop storage. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 73-7
Control of insect infestation, microbial spoilage and physiological changes have been discussed and the WHO evaluation and codex alimentaris commission regulation and the practical feasibility of food irradiation have been covered. KAR

1535 BULL (JO). Rodent and insect control in stored food crops. A contractor's view-point. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 91-5
Discussed the prevention of infestation control from exporters, shipowners, importers, warehouse management and factory management view point. KAR

1536 HUNTER (FA). Problems encountered in protecting stored grain from damage by rodents, birds, insects and mites in England and Wales. *Prog. Food Nutr. Sci.* 4(3-4); 1980; 79-90

1537 KENNEFORD (S) and O'DOWD (T). Guidelines on the use of flexible silos for grain storage in tropics. *Trop. Stored Prod. Inf.* 42; 1981; 11-9

INFESTATION CONTROL AND PESTICIDES

1538 BANSODE (PC) and BHATIA (SK). The susceptibility of a malathion-resistant strain of the rice weevil *Sitophilus oryzae* (L.) to seven fumigants. *Bull. Grain Technol.* 18(3); 1980; 188-91

Investigations were carried out in the laboratory to evaluate the efficacy of seven fumigants against a laboratory-selected malathion-resistant strain of *Sitophilus oryzae* which was 39 times more resistant to malathion than a susceptible strain. The comparison of susceptibility was made on the basis of the ratio obtained on dividing the LD_{50} of the resistant strain by that of the susceptible strain. The ratios obtained for each of the fumigants were: methyl bromide X2.1, phosphine X1.7, carbon disulphide X1.0, ethylene dichloride/carbon tetrachloride mixture (EDCT, 3:1)X1.0, ethylene dibromide X1.3, ethylene dichloride X1.1 and carbon tetrachloride X0.9. Thus resistance to malathion in this species did not result in significant cross-resistance to any of the seven fumigants tested. AA

1539 ASHOK KUMAR, DOHAREY (RB), PANDEY (GP) and VARMA (BK). Efficacy of nitrogen gas against stored grain insect pests. *Bull. Grain Technol.* 18(3); 1980; 192-4

Efficacy of nitrogen gas (controlled atmosphere) was evaluated against major stored grain insect pests. Two thousand gram of nitrogen gas in a 111 litre capacity mild steel cylinder filled with wheat brought oxygen level upto 1 per cent and gave cent percent mortality in the adults of *Sitophilus oryzae* (Linn.), *Tribolium castaneum* (Herbst), *Rhizopertha dominica* (F.) and grubs of *Trogoderma granarium* (Everts) within 7 days exposure period. AA

1540 CHOPRA (G) and SOOD (ML). Feeding behaviour of soft-furred field rat, *Rattus meltada* (Gray): oils. *Bull. Grain Technol.* 18(3); 1980; 204-7

Rattus meltada (Gray) is one of the predominant murid species occurring in the fields of Punjab, causing damage to almost all the major crops. In preparation of poison baits with the recommended rodenticide, an oil is always used as an adhesive agent. To study oil preferences, various paired and multiple-choice tests were conducted, utilizing three common oils, i.e. groundnut, coconut and mustard oil at 10 per cent concentrations mixed homogeneously in 90 per cent wheat flour. The results revealed the preference of the metads towards oils in the decreasing order as groundnut oil > coconut oil > mustard oil at 10 per cent concentrations. In control tests also, oily diets received more attention by *R. meltada* as compared to non-oily diets. AA

1541 WARE (GW), CROSBY (DG) and GILES (JW). Photodecomposition of DDA. *Arch. Environ. Contam. Toxicol.* 9(2); 1980; 135-46

1542 McNEAL (T) and BREDER (CV). Headspace sampling and gas-solid chromatographic determination of residual cacrylonitrile in acrylonitrile copolymer solution. *J. Assoc. Off. Anal. Chem.* 64(2); 1981; 270-75

1543 JALEES (K). Resistance to pesticides. A growing problem. *Invent. Intell.* 16(7); 1981; 314-5

Discusses: emergence of the 'super-pest'; selective survival; and the alternative. BSN

1544 DEO (PG), HASAN (SB) and MAJUMDER (SK). Isomerization of β-HCH in aqueous solution. *J. Environ. Sci. Health.* B15(2); 1980; 147- 64

β-HCH was shaken with distilled water at 25 ± 1 C for different time intervals and filtered. The ether extract of the filtrate on analysis by gas liquid chromatography showed the presence of four isomers α, β, γ and δ, besides other compounds, thereby indicating isomerization of the β-isomer in aqueous solution. Further, the ether extract, when dried and dissolved in acetone, showed high toxicity to mosquito larvae, flour beetle larvae and house-flies thereby indicating conversion of the inert β-isomer to more toxic forms corroborating GLC analysis. Acetone solution of pure β-HCH was found nontoxic against the insects tested. AA

1545 KNAAK (JB), JACKSON (T), FREDRICKSON (AS), MADDY (KT) and AKESSON (NB). Safety effectiveness of pesticide mixing-loading and application equipment used in California in 1976. *Arch. Environ. Contam. Toxicol.* 9(2); 1980; 217-29

1546 KNAAK (JB), JACKSON (T), FREDRICKSON (AS), RIVERA (L), MADDY (KT) and AKESSON (NB). Safety effectiveness of closed-transfer, mixing-loading, and application equipment in preventing exposure to pesticides. *Arch. Environ. Contam. Toxicol.* 9(2); 1980; 231-45

1547 MOLINARI (GP), DEL RE((A), REDAELLI (C) and FORMENTINI (L). Determination of pesticide residues in camomiles: Risks of error in the detection of organochlorine compounds. *Ind. Aliment.* 20(180); 1981; 91-4 (Italian)

Camomile flowers (*Matricaria chamomilla* L.) of two types - which are used for making tea - didnot contain any anti-parasitic agents, except for very modest amounts of lindane, well below the tolerance limit of 0.1 ppm fixed by Italian legislation, and of 0.5 ppm fixed by German legislation. KMD

1548 KHANDEKAR (SS), NORONHA (ABC) and BANERJI (SA). Organochlorine pesticide residues in eggs and milk available in Bombay markets. *Sci. Cult.* 47(4); 1981; 137-9

Results of two surveys carried out during 1976-79 on the occurrence of organochlorine residues in 43 milk samples procured from Government booths and local vendors and 37 egg samples collected from Bombay (India) are reported. The extent of contamination (ppm) was BHC, 0.01-1.01; lindane 0.01-0.78, heptachlor, 0.04-0.60; aldrin, 0.03-0.52; dieldrin, 0.12-2.5; and DDT, 0.47-2.1. MVG

1549 TAYYABA (K), MAHDI HASAN, FAKHRUL ISLAM and KHAN (NH). Organophosphate pesticide Metasystok - induced regional alterations in brain nucleic acid metabolism. *Indian J. Exp. Biol.* 19(7); 1981; 688-90

Intra-peritoneal injection of the organophosphate, Metasystox R (0,0-dimethyl-S-2-(ethylsulphinyl) ethyl thiophosphate) at a dose of 4 mg/kg body weight altered the nucleic acid concentration as well as the function-

al activity of the lysosomal enzymes in the brain. Hence, though organophosphates are less toxic to mammals than, say, the chlorinated hydrocarbons, their neurochemical effects need to be investigated further. KMD

BIOCHEMISTRY AND NUTRITION

1550 COLES (BA). Protein determination by nuclear magnetic resonance. *J. Am. Oil Chem. Soc.* 50(7); 1980; 202-4

1551 WIRTHS (W). Results from nutritional surveys: Their value for nutrition and food science. *Z. Lebensmittel-Unters Forsch.* 170(2); 1980; 87-94 (German).

Various survey methods have been used in estimating the dietary intake of individuals, families and other groups. Every method has its advantages and disadvantages and its practical, financial and technical difficulties. The choice is also limited by the quality of the population studied. The nutrient level is shown by many parameters: cholesterol level, thiamine intake, uric acid level, ascorbic acid level in plasma, SO_2-intake. Field studies were done with different groups of the population; pupils; elderly people living in homes, heavy workers, sedentary workers, clerks, policemen, sportsmen, students. SO_2-intake is related with thiamin intake. It is very different from group to group (0.05-47.7 mg)/thiamin. AA

1552 SUKHATME (PV). Measuring the incidence of undernutrition. *Econ. Pol. Wkly.* 26(23); 1981; 1034-6

1553 CHAKRABARTI (SK) and PANDA (MK). Measurement of incidence of under-nutrition. *Econ. Pol. Wkly.* 16(31); 1981; 1275-8

1554 GEYER (R), MOORE (T) and ROBBINS (DM). Some aspects of the composition of bottled natural mineral waters: A note. *Food Technol. Aust.* 33(3); 1981; 94

1555 HUTT (PB). Regulatory implementations of dietary recommendations. *Food Drug. Cosmet. Law J.* 36(2); 1981; 66-89

Discusses: dietary goals for USA; FDA administration; labeling requirements; Federal Trade Commission; nutrition claims; food and nutrition service; child nutrition programmes; and other agencies. BSN

1556 FINZI (M). Trace elements and human nutrition. *Ind. Aliment.* 19(174); 1980; 555-9 (Italian)

Several tables give information on the content of zinc, selenium, chromium, cobalt and copper, in various kinds of foods. KMD

1557 ANON. Recent developments in the aminoacids analysis with ionic exchange chromatography. *Ind. Aliment.* 19(174); 1980; 561-2 (Italian)

1558 FAROOQUI (S), MAHMOOD (A), NATH (R) and THIND (SK). Nutrition and Vrolithiasis: Part I - Intestinal absorption of oxalate in vitamin B_6 deficient rats. *Indian J. Exp. Biol.* 19(6); 1981; 551-4

Intestinal absorption of oxalate was considerably higher in vitamin B_6 deficient rats than in the pair-fed controls ($P < 0.001$). This may be due to induction of oxalate in the enterocytes. At concentrations above 0.8mM oxalate absorption showed the characteristics of biphasic transport; at a

concentration less than 0.8mM, absorption took place by a saturable mechanism involving facilitative diffusion. Administration of actinomycin D to vitamin B_6 deficient rats altered the biphasic transport mechanism to a simple diffusion process, like that observed in the intestines of the control rats. KMD

1559 LLEWELLYN (GC), DUEKHARDT (NE), FISHER (MF), EADIE (T) and O'REAR (CE). Growth, sporulation and aflatoxin production by *Aspergillus parasiticus* on strained baby foods. *J. Food Prot.* 43(6); 1980; 428-30,434

Four pureed foods were inoculated with the mold and cultured at 15 and 26 C in two series of experiments. The aflatoxigenic mold produced mycelia and sporulated at both temperatures. The foods ranked in mean total yield of aflatoxin (µg/g of substrate) in the following order: peas > squash > green beans > pears. The ranking held consistent for both temperatures. Aflatoxins B_1 and G_1 were produced in higher percentages than B_2 and G_2. in each food at both temperatures. AT 26 C, total aflatoxin produced ranged from 8 to 71 µg/g of substrate and at 15 C, the mean for the four foods was from 3 to 50 µg/g of substrate. Temperature and substrate were the primary variables which contributed to sporulation rate, toxin production and toxin ratios. Peas and squash should be considered primary and highly supportive substrates for aflatoxin production if conditions should arise for spores to contaminate the products either during or after processing. Absolute prevention of aflatoxigenic spore contamination in these foods studied is essential. An occasional testing of these foods for aflatoxin seems warranted. A lower temperature during aflatoxin formation decreased the total toxin formed, but did not prohibit aflatoxin occurrence. A lower temperature also tended to divert the type of toxin produced from B_1 to the less dangerous G_1 and G_2. Aflatoxin would appear to be a problem in these foods only under rare and unusual circumstances in relation to processing and consumer usage. If such aflatoxigenic spore contamination should occur, the levels produced would be significant. AA

TOXICOLOGY AND HYGIENE

1560 ANON. Approved code of practice for the control of lead at work. *Environ. Health.* 89(1); 1981; 20

1561 KING (MM) and McCAY (PB). Studies on liver microsomes of female rats fed purified diets varying in fat content and with and without propyl gallate. *Food Cosmet. Toxicol.* 19(1); 1981; 13-7

This work was undertaken to determine whether or not propyl gallate, added as a 0.3% (w/w) supplement to purified diets containing various types and amounts of fat, modifies the function of the hepatic microsomal mixed-function oxidase system. In contrast to butylated hydroxytoluene, propyl gallate at a level of 0.3% in the diet did not alter the function of the mixed-function oxidase system, even when administered in a diet high in polyunsaturated fat. AA

1562 SMITH (FA), MURRAY (FJ), JOHN (JA), NITSCHKE (KD), KOCIBA (RJ) and SCHWETZ (BA). Three-generation reproduction study of rats ingesting 2,4,5-trichlorophenoxyacetic acid in the diet. *Food Cosmet. Toxicol.* 19(1); 1981; 41-5

1563 ALBRECHT (R), PELISSIER (MA), FAUDEMAY (F) and DOOH-PRISO (E). Induction of microsomal monoxygenases in the rat liver: effect of a 72 hour fast. *Food Cosmet. Toxicol.* 19(1); 1981; 47-52 (French)

Ingestion of lindane accelerated the biotransformation of aminopyrine and of aniline by the liver microsomes and increased the P-450 content and the proportion of linoleic acid in the phosphatidylcholine. Fasting partly counteracted the induction of aminopyrine N-demethylase and of P-450 and completely suppressed the characteristic effect of the pesticide on the linoleic acid content of the phosphoglyceride. It is suggested that lindane treatment leads to the induction of a particular form of P-450 that is sensitive to starvation and bound in the membrane to a phosphatidylcholine rich in linoleic acid. AA

1564 McNULTY (WP), POMERANTZ (I) and FARRELL (T). Chronic toxicity 2,3,7,8-tetrachlorodibenzofuran for rhesus macaques. *Food Cosmet. Toxicol.* 19(1); 1981; 57-65

Polychlorinated dibenzofurans (PCDFs) are among the most toxic low-molecular-weight organic chemicals known. They are unwanted contaminants in the wood-preservative, pentachlorophenol, and in polychlorinated biphenyls (PCBs). High levels of PCDFs were found in the Kameni rice oil contaminated with PCB, that caused Yusho, an epidemic of human poisoning, in Japan. The authors have studied the effects of feeding 50-5 µg/kg(ppb) of 2,3,7,8-tetrachlorodibenzofuran to rhesus macaques over a period of 2-6 months. KMD

1565 McKENNA (MJ) and ZEMPEL (JA). The dose-dependent metabolism of (^{14}C)-methylene chloride following oral administration to rats. *Food Cosmet. Toxicol.* 19(1); 1981; 73-8

Methylene chloride (CH_2Cl_2) has many application, including some in the food industry, and, in particular, the decaffeination of coffee. Hence, its toxicity has been studied. Its major metabolites are CO and CO_2, both of which are found in expired air. The effects of doses ranging from 1 mg/kg to 50 mg/kg in rats have been reported. KMD

1566 HAUSCHILD (AHW) and BRYAN (FL). Estimate of cases of food- and waterborne illness in Canada and the United States. *J. Food Prot.* 43(6); 1980; 435-40,446

1567 ANEMA (PJ) and SCHRAM (BL). Prevention of post- process contamination of semi-rigid and flexible containers. *J. Food Prot.* 43(6); 1980; 461-4

1568 STERSKY (A), TODD (E) and PIVNICK (H). Food poisoning associated with post-process leakage (PPL) in canned foods. *J. Food Prot.* 43(6); 1980; 465-76,483

1569 BROWN (BE) and ERDMAN (IE). Regulatory aspects of post-processing microbiological contamination of low-acid canned foods. *J. Food Prot.* 43(6); 1980; 477-83

1570 ITO (K) and SEEGER (ML). Effects of germicides on microorganisms in can cooling waters. *J. Food Prot.* 43(6); 1980; 484-7

1571 PUT (HMC), WITVOET (HJ) and WARNER (WR). Mechanism of microbiological leaker spoilage of canned foods: Biophysical aspects. *J. Food Prot.* 43(6); 1980; 488-97

1572 GUILFOYLE (DE) and MESTRANDREA (LW). Problems encountered with the capillary tube immunodiffusion method for detection of botulinal toxin. *Appl. Environ. Microbiol.* 40(4); 1980; 847-8

1573 DICKENS (JW), McCLURE (WF) and WHITAKER (TB). Densitometric equipment for rapid quantitations of aflatoxins on thin-layer chromatograms. *J. Am. Oil Chem. Soc.* 57(7); 1980; 205-8

The "Spotmeter" measures the total amount of fluorescence of the aflatoxin spot, and thus eliminates the need for scanning mechanisms, plotters, and integrators that are incorporated into most commercially available densitometers used for aflatoxin analysis. Compared to a Schoeffel SD spectrodensitometer, the Spotmeter is atleast equally accurate, or even more accurate. It requires only one-fourth the time required by the Spectrodensitometer to make a measurement, and costs only one-sixth as much as commercially available densitometers suitable for aflatoxins analysis. KMD

1574 WHITAKER (JR) and GRANUM (PE). The role of amino groups in the biological and antigenic activities of *Clostridium perfringens* type A enterotoxin. *J. Food Biochem.* 4(4); 1980; 201-17

1575 GRANUM (PE) and WHITAKER (JR). Perturbation of the structure of *Clostridium perfringens* enterotoxin by sodium dodecyl sulphate guanidine hydrochloride, pH and temperature. *J. Food Biochem.* 4(4); 1980; 219-34

I N D E X

Acetylaminofluorene
effect on NADPH-Cytochrome P-450 reductase activity 1345
Acrylonitrile copolymer
residual acrylonitrile determination 1542
Additive
contaminants in food supply 1335
review 1334
Aerosol
mould growth control in bread 1420
Aflatoxin
analysis by densitometric equipment 1573
food toxicant 1335
Alcohol 1510
from deproteinated whey or ultrafiltration permeate by batch process 1511
Aminoacid analysis, recent development 1557
Anchovies
sodium and potassium composition 1489
Antioxidant 1343-4
application of enzyme catalysed system 1341
application of hemecatalysed system 1342
Apple
colour evaluation 1408
maturity and quality, *effect of* ethrel 1407
Aromatizing agents 1523

Bacillus macerans
cyclodextrin-transglycosylase production 1417
Bajra
separation of ergot 1373
Beef
proteolysis 1462
Beetroot
membrane permeability changes 1392
Benzoic acid
isotachophoretic determination 1337
Beverage
heterocyclic compound 1522
Biogas
production from fish and chicken waste 1469
Black gram
α-amylase and phytoghemagglutinin evaluation 1375
Blood plasma, zearalenone analysis 1457
Bottled water 1310
Brassica oleracea
fatty acid composition 1378
Bread
mechanical dough development 1421
mould growth, control by aerosol 1420
propionic acid determination by GLC 1423
Breadfruit
starch isolation and characterisation 1402
Breakfast cereal
phytic acid and phosphorus composition 1349
Brewers yeast use 1329
Brewing
barley 1509
Broiler
body weight and fat deposition 1471
carcasses, fat content 1470
damaged maize and wheat nutritive value 1475-6
Salmonella isolation 1474
Butylated hydroxyanisole
oxidation product 1343-4
Butylated hydroxytoluene
effect on NADPH-cytochrome P-450 reductase activity 1345
oxidation product 1344

Cake
volume, *effect of* cultivar and flour particle size distribution 1424
Calcium stearoyl-2-lactylate metabolism 1514
Callosobruchus maculatus
oviposition response and development on cowpea 1377
Camomile
pesticide residue determination 1547
Cancer
dietary fat and propyl gallate 1561
Can cooling water
germicide 1570

GENERAL

1576 ALI (I), DESAI (BM), RADHAKRISHNA (R) and VYAS (VS). Indian agriculture at 2000 strategies for equity. *Econ. Pol. Wkly.* 16(10-12); 1981; 409-24
Discusses: methodology; background; base year (1975) solution; feasibility of rationale at AD 2000 targets; results of strategies; and conclusions. BSN

1577 DASARADHARAMI REDDY (B). Use of energy in agriculture. *East. Econ.* 78(8); 1982; 531-3

1578 HOLMES (AW). Research in the future. *Food Process Ind.* 50(592); 1981; 28-9

1579 COPPOCK (JBM). Food Technology. What lies ahead... *Food Process Ind.* 50(592); 1981; 23-7

1580 CLEMINSON (J). The next decade. *Food Process. Ind.* 50(592); 1981; 19-22
Discusses: new markets; changing trends; new technology; the convenience factor; competition with the EEC. BSN

FOOD PROCESSING AND PACKAGING

1581 GUISE (B). Frozen Foods. *Food Process. Ind.* 50(592); 1981; 45-7,51-3,55
Discusses problems of packaging of frozen poultry, fruits and vegetables, fish and fish products, meat products, pizzas, confectionery and desserts and ice cream. BSN

1582 VARNER (SL) and BREDER (CV). Liquid chromatographic determination of residual styrene in polystyrene food packaging. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 647-52

1583 MATHUR (AB) and MATHUR (GN). Photo-oxidative degradation of polypropylene film. *Indian J. Technol.* 20(2); 1982; 80-82
Samples of isotactic polypropylene film were aged by UV radiation in a weatherometer, under controlled conditions. Reactions which affect the molecular structure, i.e. formation of oxygenated and unsaturated groups in polypropylene, are discussed. M_V was found to decrease faster, because of preferential backbone cleavage (-C-C-bond). Changes in tensile strength, isotacticity, and density are discussed, on the basis of changes in structure and ordering at the molecular level in the inter-crystalline regions. KMD

FOOD ENGINEERING AND EQUIPMENT

1584 ROLLS (T). Control systems for automated food processing plants. *Food Process. Ind.* 50(590); 1981; 27-31

FOOD CHEMISTRY AND ANALYSIS

1585 HUNTER (JS). Calibration and the straight line: Current statistical practices. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 574-83

1586 HOFMANN (E), BUCHNER (M) and HEBECKER (W). On the use of high voltage electrophoresis (HVE) for the separation of some important classes of compounds. *Nahrung.* 24(3); 1980; 239-41 (German)

1587 DANIELS (DH), WARNER (CR) and BIRKEL (TJ). Use of closed-system vacuum distillation for isolation of moderately volatile compounds. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 769-71

1588 BORUS-BOSZORMENYI (N). Square-wave polarographic determination of copper, lead, cadmium, zinc and tin in food. *Nahrung.* 24(3); 1980; 295-302 (German)

Simultaneous measurement of copper, lead, cadmium and zinc is dealt with taking ratios of metals in food into consideration. It has been found that metal components do not interfere with each other. The investigations showed that cobalt and manganese do not interfere with zinc determination. Nickel begins to interfere only in such large amounts as hardly occur in food. The method was applied for several canned products and raw materials for food industry and comparative measurements were made with spectrophotometric methods to test the polarographic method. Recovery was also studied by addition of known amounts of metal components. The test results show that the suggested polarographic method is rapid, accurate, well reproducible and very sensitive for the determination of copper, lead, cadmium, zinc and tin in food. AA

1589 SUDDENDORF (RF), WRIGHT (SK) and BOYER (KW). Sampling procedure and determination of lead in canned foods. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 657-60

1590 NANDA KUMAR (NV) and PRAMEELA DEVI (Y). Paper and micro thin layer chromatographic methods for determination of mercuric chloride and detection of copper sulphate. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 729-32

1591 ROSSI (L). Fourth interlaboratory study of methods for determining total migration of plastic materials in liquids simulating fatty foodstuffs. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 697-703

1592 WILLIAMS (DT), LEBEL (GL) and BENOIT (FM). Identification of trialkly and triaryl phosphates in distilled and super-Q water. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 635-40

FOOD MICROBIOLOGY

1593 WALLEN (SE) and WALKER (HW). Resistance of spores of *Bacillus subtilis* variety *niger* produced from subcultures of spores surviving hydrogen peroxide exposure. *J. Food Prot.* 43(7); 1980; 528-9

The purpose of this work was to determine if the resistance of bacterial spores could be increased by subculturing spores that had survived

exposure to hydrogen peroxide. Spores surviving exposure to 5% hydrogen peroxide held at 50 C were subcultured, allowed to sporulate and subsequently exposed to hydrogen peroxide as before. After 10 generations of subculturing, the resistance of the spores had not increased. It is concluded that, in food processes in which high concentrations of hydrogen peroxide are used to sterilize food processing equipment and food packaging materials, the development of a resistant spore population is unlikely. AA

YEAST

1594 AL ANI (D), HENDERSON (C), and GOMA (G). Culture of yeasts on N-alcanes: Studies, with a chemostat, on the influence of addition of a solubilizing agent on the growth of *Candida lipolytica*. *Ind. Alim. Agric.* 97(6); 1980; 565-72 (French)

Yeasts were cultured on n-alcanes, in a chemostat, in the presence and absence of a surfactant. The cell density, residual substrate concentration, productivity, and yield of biomass were compared. A better performance was obtained in all cases where a surfactant, sorbitol oleate had been used. The latter increased the yield of biomass, and decreased the residual concentration of n-alcanes. No significant differences were observed in the nitrogen content and aminoacid composition of the cells. KMD

1595 QUAIN (DE), THURSTON (PA) and TUBB (RS). The structural and storage carbohydrates of *Saccharomyces cerevisiae*. *J. Inst. Brew.* 87(2); 1981; 108-11

MUSHROOM

1596 MORITZ (J). High levels of cadmium in Swedish wild mushrooms. *Varfoda.* 32(5); 1980; 270-77

Cadmium levels have been determined in 88 samples of wild mushrooms. High levels were found in all the samples of *Agaricus macrosporus* and *Agaricus augustus* (mean levels 6 and 3.9 mg cadmium per kg fresh mushroom, respectively). In about half of the samples of A. *arvensis*, A. *abruptibulbus* and A. *silvicola* the cadmium levels were low (below 0.5 mg/kg) and in the other half they were 0.7-23.4 mg/kg. However, all the samples of A. *campestris* and cultivated mushrooms (A. *bisporus*) contained low levels. There is nothing to indicate that the mushrooms with high levels of cadmium had been contaminated with cadmium from neighbouring industries, refuse incinerators or land which had been treated with commercial fertilisers. In view of their high cadmium levels, the National Food Administration recommends that A. *arvensis*, A. *abrutibulbus*, A. *silvicola*. A. *macrosporus* and A. *augustus* should not be eaten more than a couple of times a year. AA

1597 HOFSTEN (B). The nutritional value of mushrooms. *Varfoda.* 32(3); 1980; 279-83

FOOD ADDITIVES

1598 SPADA DI NAUTA (V). New considerations on the Italian law concerning chemical food additives. *Ind. Aliment.* 19(175); 1980; 653-67 (Italian)

1599 CALVEY (RJ), GOLDBERG (AL) and MADIGAN (EA). High performance liquid chromatographic determination of intermediate/side reaction products in FD&C yellow No.5. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 665-9

1600 BEDOUKIAN (PZ). Perfumery and flavour materials. *Perfum. Flavor.* 6(2); 1981; 1-23

Review covers: perfumes and olfaction; studies on flower oils; research in terpenes and sesquiterpenes; research in aroma chemicals; nitriles in perfumery; furan and pyran derivatives; bicyclic aroma chemicals; tricyclic aroma compounds; ionones, irones and damascones; jasmone series; research in musk compounds; research in flavours (fruit flavours, tea flavours, orange flavours, cereal flavour, cheese flavour, alliacious flavours, meat flavour); miscellaneous flavours; and reviews and books of interest. BSN

1601 MASUDA (H), YOSHIDA (M) and SHIBAMOTO (T). Synthesis of new pyrazines for flavour use. *J. Agric. Food Chem.* 29(5); 1981; 944-7

CEREALS

1602 VESONDER (RF) and HESSELTINE (CW). Vomitoxin: Natural occurrence on cereal grains and significance as a refusal and emetic factor to swine. *Process Biochem.* 16(1); 1980-81; 12-5,44

PADDY

1603 VASAN (BS) and KUMARAVEL. The role of dissolved oxygen in the improvement of cold soaking process of paddy. *J. Food Sci. Technol.* (India). 19(1); 1982; 31-4

Spoilage of paddy as indicated by foul smell, cloudiness, slimy growth in the soak water and loss of dry matter during cold soaking is related to changes in the dissolved oxygen (DO) content of the soak water. The DO of the soak water was completely used up within 24 hours of soaking, when the above spoilage changes were noticed. Addition of sodium chromate at 0.05% (w/w) to soak water, chemical sterilization of paddy before soaking and refrigerated soaking at 5-10 C, kept the DO of soak water between 1.5 and 10.5 ppm at the end of soaking and thus helped in eliminating the spoilage and minimising the dry matter loss. Addition of H_2O_2, sodium peroxide and potassium permanganate to soak water increased the DO initially, which completely depleted within 48 hours resulting in the spoilage and dry matter loss. AA

1604 SINGH (T), TYAGI (RPS) and VARMA (BK). Study of the occurrence of aflatoxin B_1 in foodgrains. *J. Food Sci. Technol.* (India). 19(1); 1982; 35-7

125 samples of paddy, rice, parboiled rice, wheat, jowar, raw and roasted groundnut and maize were collected from village markets and godowns (India) and analysed for aflatoxin B_1 content. Paddy, parboiled rice and wheat did not contain aflatoxin, whereas others showed the presence from 1 to 700 ppb of aflatoxin B_1. KAR

RICE

1605 MOHAMMAD KUNHI (AA), GEETHA DEVI (BR), SITARAM (N) and RAMACHANDRA RAO (TN). Single cell protein from rice straw. *Indian Food Packer.* 36(4); 1981; 39-46

Studies were carried out to standardise a medium for the production of single cell protein from alkali treated straw (ATS) by a strain of *Penicillium chrysargaeum.* Ammonium dihydrogen phosphate and a combination of urea and ammonium sulphate were found to be the best sources of nitrogen. The optimum amounts were 500,200,200,30 and 5 mg per litre of medium. Addition of trace elements Fe, Mn, Co, Zn and Cu did not show any significant increase in protein yield. Substrate concentration of 1 to 1.5% (w/V) was found to be most suitable for maximum production of protein. No significant effect was observed when tap water was used in the place of distilled water for media preparation. The efficiency of the optimised medium was compared with 3 other standard media used to grow celluloytic organisms. The production of SCP was scaled upto 40 ℓ fermentor level. The product obtained from the fermentor after 72 hours growth contained 34% crude protein, whereas that from the shake flasks contained 38-42% protein. 93-96% of the 74-76% cellulose originally present in ATS was utilized by the organism. The conversion of ATS to crude protein was about 19%. AA

WHEAT

1606 OSBORNE (BG), DOUGLAS (S) and FEARN (T). Assessment of wheat grain texture by near infrared reflectance measurements on Buhler-milled flour. *J. Sci. Food Agric.* 32(2); 1981; 200-202

A calibration is presented between near infrared (NIR) reflectance data at 1720 and 1288 nm and wheat grain kernel texture as determined by air-jet sieving on flour Buhler-milled from home-grown wheat. A multiple correlation of 0.996 and a residual standard deviation of 0.140 was achieved with a calibration set of 40 samples and the result was verified by prediction of values of further samples. The calibration was valid over two successive harvests (1978 and 1979). A separate calibration was obtained using a Neotec 101 instrument using data around 2230 nm when a multiple correlation of 0.974 and residual standard deviation of 0.32 was obtained. A calibration equation and pulse point are presented. AA

OAT

1607 HEYDANEK (MG) and McGORRIN (RJ). Gas chromatography - mass spectroscopy investigations on the flavour chemistry of oat groats. *J. Agric. Food Chem.* 29(5); 1981; 950-54

Dried oat groat volatiles were characterized by GC-MS in an effort to study the inherent flavour chemicals in oats before processing. Volatile isolation by vacuum distillation and Tenax headspace trapping, both before and after hydration, resulted in compositionally different isolates. Dry vacuum distillates primarily contained $C_{10}H_{16}$ monoterpenes, alkylbenzenes, and hexanal. Vacuum steam distillation resulted in large increases of volatiles presumed to originate via residual enzyme activity on oat lipids. Major amounts of C_4-C_6 alcohols, hexanal, 1-octen-3-ol, nonanal, and (E,E)- and (Z,E)-3,5-octadien-2-one were found in the hydrated groat isolates. Headspace isolation, dry and hydrated, also exhibited this difference. Oat groats do not appear to contain large amounts of inherent flavour components

but depend on further processing for oat flavour development. AA

1608 HEYDANEK (MG) and McGORRIN (RJ). Gas chromatography - mass spectroscopy identification of volatiles from rancid oat groats. *J. Agric. Food Chem.* 29(5); 1981; 1093-5

GC-MS study of oat groat volatiles showed that predominant volatile present were hexanal, pentanal, 1-pentanol, and 3,5-octadien-2-one. Of the forty five compounds identified, 24 were aldehydes, with the rest made up of ketones and alcohols, probably formed as a result of lipid autooxidation. BSN

RYE

1609 CHARBONNIER (L), TERCE-LaFORGUE (T) and MOSSE (J). Rye prolamins: Extractability, separation and characterization. *J. Agric. Food Chem.* 29(5); 1981; 968-73

Compared with some concentrations of aqueous 1-propanol and 2-propanol, 60% (w/w) ethanol was found to be the best extractant of rye prolamins (secalins) with respect to purity. Rye meal defatting with water-saturated 1-butanol before extraction resulted in a 40% loss of secalin yield. Secalins were separated by ion-exchange chromatography and gel filtration. They are distributed in three groups named A,B, and C by order of increasing molecular weight (M_r). Like ω-gliadins and C hordeins,C secalins (M_r 38 000) have high Glx and Pro contents and are free of sulphur amino acids. B secalins (M_r 29 000) are similar to α-, β-, and γ-gliadins and therefore, are probably the only secalins noxious for gluten-sensitive people. A secalins (M_r 16 000) have molecular weights in the same range as low molecular weight gliadin and A hordein molecular weight. They are Lys and His free and have much higher sulphur amino acid and Tyr contents than other secalins. Leu, Asx, and Arg are the N-terminal amino acids of A,B, and C secalins, respectively. AA

PAPAD

1610 ANON. Papads-fast growing item of export. *Indian Exp. Trade J.* 36(2/3); 1982; 19-21

MILLETS

SORGHUM

1611 GLENNIE (CW), KALUZA (WZ) and Van NIEKERK (PJ). High-performance liquid chromatography of procyanidins in developing sorghum grain. *J. Agric. Food Chem.* 29(5); 1981; 965-8

1612 BULLARD (RE), YORK (JO) and KILBURN (SR). Polyphenolic changes in ripening bird-resistant sorghums. *J. Agric. Food Chem.* 29(5); 1981; 973-81

1613 MUINDI (PJ) and THOMKE (S). The nutritive value for rats of high- and low-tannin sorghums treated with magadi soda. *J. Sci. Food Agric.* 32(2); 1981; 139-45

Grain sorghums containing 1.3,0.7 and 0.5% tannins were treated with

unrefined magadi soda (37.5 g litre^{-1}) for 3 days at 25 C and evaluated in a bioassay with male weanling rats. The alkaline treatment of the samples containing 1.3 and 0.7% tannins was found to significantly increase the digestibility of crude protein, crude carbohydrates and energy and to improve the biological value (BV) of the protein. Such an effect was not found for the third sorghum cultivar (0.5% tannins). AA

MAIZE

1614 KAMI (T). Composition of the essential oil of soiling dent corn. *J. Agric. Food Chem.* 29(5); 1981; 909-11

1615 HANSEN (TJ), TANNENBAUM (SR) and ARCHER (MC). Identification of a nonenylnitrolic acid in corn treated with nitrous acid. *J. Agric. Food Chem.* 29(5); 1981; 1008-11

As a result of nitrosylation of corn by nitrous acid, an unsaturated nine-carbon nitrolic acid is formed, besides the already identified nitrohexane. Nitrolic acid has a similar behaviour like N-nitroso compounds in various chemical tests for distinguishing from other compounds exhibiting chemiluminiscence. BSN

1616 BLANCO-LABRA (A) and ITURBE-CHINAS (FA). Purification and characterization of an α-amylase inhibitor from maize (*Zea mays*). *J. Food Biochem.* 5(1); 1981; 1-17

1617 BENNETT (GA), SHOTWELL (OL) and HESSELTINE (CW). Destruction of zearalenone in contaminated corn. *J. Am. Oil Chem. Soc.* 57(8); 1980; 245-7

Levels of zearalenone in samples of contaminated corn (i.e. maize) could not be reduced by an ammoniation process that reduces aflatoxin levels, nor by treatments with propionic, acetic or hydrochloric acids, nor by sodium bicarbonate, nor by hydrogen peroxide. High temperature treatment (150 C) also had no effect on zearalenone. In contrast, formaldehyde, either as a vapour or in an aqueous solution, destroyed significant quantities of zearalenone in naturally contaminated, yellow, corn meal, in spiked corn grits and in animal feed. Ammonium hydroxide and formaldehyde partially destroyed zearalenone in highly contaminated ground corn. No treatment used in this study significantly reduced zearalenone levels in whole kernel corn. KMD

1618 MOERCK (KE), McELFRESH (P), WOHLMAN (A) and HILTON (BW). Aflatoxin destruction in corn using sodium bisulphite, sodium hydroxide and aqueous ammonia. *J. Food Prot.* 43(7); 1980; 571-4

Naturally contaminated yellow dent corn containing 235 ppb of aflatoxin B_1 and B_2 was adjusted to a moisture content of 20% and then treated for 24 hours at ambient temperature with $NaHSO_3$, NaOH or aqueous NH_3 at 0.5%, 1.0%, or 2.0% concentrations. All treatments were effective in reducing aflatoxin B_1 and B_2 levels. Sodium bisulphite was more effective in destroying aflatoxins than were NaOH or aqueous NH_3 at 0.5% and 1.0% concentrations, while NaOH and aqueous NH_3 were more effective than bisulphite at 2.0% concentration. Subjecting yellow corn samples to either $NaHSO_3$, NaOH or aqueous NH_3 at 2.0% concentrations reduced aflatoxin B_1 and B_2 levels to below the FDA guideline of 20 ppb total aflatoxin. Sodium bisulphite was also effective in reducing the levels of aflatoxins in a white dent corn sample containing 81 ppb of aflatoxin B_1 and 12 ppb of

aflatoxin B_2. Results suggest that $NaHSO_3$, NaOH or aqueous NH_3 can be used to effectively destroy aflatoxin in corn and possibly other agricultural commodities. AA

1619 STOLOFF (L) and TRUCKSESS (MW). Effect of boiling, frying and baking on recovery of aflatoxin from naturally contaminated corn grits or cornmeal. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 678-80

Corn grits naturally contaminated with aflatoxins were used for making boiled grits, and portions of the boiled grits were used for making pan-fried grits; cornmeal naturally contaminated with aflatoxins was used for making corn muffins. From analysis of the products for aflatoxins before and after preparation of the table-ready products, it was determined that 72±9% (n = 15) of the aflatoxin found in the original grits could be recovered after the grits were boiled. The recovery of aflatoxin B_1 after the grits were fried was either 66±10% (n = 6) or 47±8% (n = 9), depending on whether 3 cups of water or 4 cups of water per cup of grits, respectively, were used for preparing the boiled grits before frying. Similarly, it was determined that 87±4% (n=9) of the aflatoxin B_1 found in the original cornmeal could be recovered from the baked muffins. No detectable aflatoxin B_{2a} was present in the extracts from any of the table-ready products. AA

BARLEY

1620 HOY (JL), MACAULEY (BJ) and FINCHER (GB). Cellulases of plant and microbial origin in germinating barley. *J. Inst. Brew.* 87(2); 1981; 77-80

1621 BAMFORTH (CW) and MARTIN (BL). The development of β-glucan solubilase during barley germination. *J. Inst. Brew.* 87(2); 1981; 81-4

1622 MARTIN (HL) and BAMFORTH (CW). An enzymic method for the measurement of total and water-soluble β-glucan in barley. *J. Inst. Brew.* 87(2); 1981; 88-91

PULSES

GREEN PEA

1623 KALRA (SK). Storage problems of solar dehydrated peas. *Indian Food Packer.* 36(4); 1981; 16-9

Green peas from 3 cultivars, viz., PNL, Jawahar and Boneville, were dried in the solar dehydrator which supplied direct and indirect solar radiation for dehydration. The dehydrated peas were stored in HD polyethylene, black polyethylene and butter paper pouches at ambient temperature (22-36 C). The initial moisture of 4-5% changed very little in butter paper, but varied in other two pouches during 3 months of study. Vitamin C declined and TSS exhibited some fluctuations. However, most of the samples in HD polyethylene and black polyethylene were spoiled within 2 months of storage, while butter paper bags proved more suitable for packaging dehydrated green peas. Jawahar variety was relatively more resistant to spoilage during storage. AA

CHICK PEA

1624 JAMBUNATHAN (R) and UMAID SINGH. Studies on desi and kabuli chickpea (*Cicer arietinum* L.) cultivars. 3. Mineral and trace element composition. *J. Agric. Food Chem.* 29(5); 1981; 1091-3

Analysis of eight desi and seven kabuli type chick peas grown at ICRISAT, Hyderabad and at Hissar, showed no significant differences in mineral composition except with regard to Ca, Zn and Mg. More amount of Ca, Zn, Cu, Fe and Mn were, however, present in seed coats of kabuli cultivars when grown at both locations. However, when grown in Hissar and kabuli varieties contained more amount of K and P. BSN

HARICOT BEAN

1625 MARQUEZ (UML) and LAJOLO (FM). Composition and digestibility of albumin globulins, and glutelins from *Phaseolus vulgaris*. *J. Agric. Food Chem.* 29(5); 1981; 1068-74

FIELD BEAN

1626 GRIFFITHS (DW) and THOMAS (TA). Phytate and total phosphorus content of field beans (*Vicia faba L.*). *J. Sci. Food Agric.* 32(2); 1981; 187-92

Considerable variation was found in the phytate and total phosphorus contents of varieties, selections and genotypes of field beans (*Vicia faba* L.). The phytate phosphorus content of seed taken from single plants of the variety Dacre indicated that large variations (1.93-4.03 g kg^{-1}), not significantly correlated with protein content existed within an established variety. Although some variation in the ratio of phytate to total phosphorus was observed (0.40-0.60), highly significant correlation coefficients were obtained for total and phytate phosphorus contents. The significance of the results obtained is discussed in relation to the potential for improving the nutritive value of field beans by breeding for lower phytate content. AA

MUNG BEAN

1627 TAYLOR (AJ), BROWN (JM) and DOWNIE (LM). The effect of processing on the texture of canned mung bean (*Phaseolus aureus*) shoots. *J. Sci. Food Agric.* 32(2); 1981; 134-8

The effect of various processing regimes on the pectic substances and the final texture of canned mung bean shoots has been studied. A blanching temperature of 75 C for 30 seconds was optimal in activating the native pectinesterase of the shoots and a holding temperature of 55 C for an optimal 30 minutes led to maximal deesterification of pectin. This treatment resulted in a canned product that was superior to a sample blanched at 100 C; the addition of calcium ions did not improve the product. AA

1628 DEL ROSARIO (RR) and FLORES (DM). Functional properties of four types of mung bean flour. *J. Sci. Food Agric.* 32(2); 1981; 175-80

The functional characteristics of mung bean flour were determined in four forms; as raw flour, blanched, sprouted, and air-classified high-protein fraction. Protein content ranged from 23 to 54%. The functional

properties investigated were: nitrogen solubility, water and fat absorption, gelation capacity, whippability and foam stability. The nitrogen solubility profile showed no significant differences. The air-classified high-protein fraction showed excellent functional properties. Mung bean was in general found to have a good potential in all the above functional properties and would, therefore, be applicable in a variety of food systems. AA

OILSEEDS AND NUTS

GROUNDNUT

1629 SHOTWELL (OL) and HOLADAY (CE). Minicolumn detection methods for aflatoxin in raw peanuts: Collaborative study. *J. Assoc. Offic. Anal. Chem.* 64 (3); 1981; 674-7

1630 TAHA (FS), ABBASY (M), EL-NOCKRASHY (AS) and SHOEB (ZE). Countercurrent extraction-isoelectric precipitation of sunflower seed protein isolates. *J. Sci. Food Agric.* 32(2); 1981; 166-74

A countercurrent extraction-isoelectric precipitation procedure for the preparation of protein isolates from defatted sunflower seed meal is described. Using 0.04M NaOH and a solvent:meal ratio of 20:1, as much as 95% of meal nitrogen was extracted. Precipitation at pH 4.0 resulted in an isolate containing 88.4% of the meal protein. Using 0.1% sodium sulphite with the alkaline solution in the countercurrent extraction resulted in a white, bland and highly pure protein isolate. Isolated sunflower seed protein is limiting in the amino acid lysine, while other essential amino acids are present in amounts which meet the dietary requirements of chicks and human adults. AA

1631 SHRIVASTAVA (BP), SADAGOPAN (VR), JOHRI (TS) and CHAND (S). Sunflower seed meal for poultry. A review. *Indian Poult. Gaz.* 65(3); 1981; 100-112

The authors have compiled tables-based on data reported in the literature - showing the proximate composition of sunflower seed meals (SSM) obtained in different ways, the amino acid composition of SSM, mineral content of SSM, vitamin content of SSM, energy content and protein quality of SSM, the growth of chicks and performance of layers fed on an SSM diet, and the comparative nutritive values of SSM, groundnut cake, and soyabean meal. They conclude that SSM is a good source of vegetable protein for poultry and livestock. KMD

SAFFLOWER SEED

1632 BASAVANA GOUD (K), KULKARNI (KA) and THONTADARYA (T-S). Residues of insecticides in safflower seed. *Pesticides.* 15(3); 1981; 12-3

SOYABEAN

1633 SHIVAHARE (US), MAHARAJ NARAIN and SINGH (BPN). Kinetics of moisture absorption by soy flour. *J. Food Sci. Technol.* (India) 19(1); 1982; 26-9

Kinetics of moisture absorption of defatted and full fat soy flour

was studied at 293, 313 and 333 K and at 75,80,85 and 100% RH. The equation developed to predict moisture as a function of temperature and RH is as follows: m_e=A exp. (B rh/T), where m_e is the final moisture and A and B are emperical constants. The values calculated are 0.022, 0.0252, and 0.245 for A and 725.37, 584.69 and 640.63 for B, for defatted, full fat cooked and uncooked soy flour respectively. Activation energies for moisture absorption for different flours were independent of the temperature and RH ranged from 8.82 to 10.0 K cal/g - mol. KAR

1634 SESSA (DJ) and ANDERSON (RL). Soyabean peroxidases: Purification and some properties. *J. Agric. Food Chem.* 29(5); 1981; 960-65

1635 NATARAJA MURTHI (T) and SHARMA (CK). Stability tests of blends of soyabean and groundnut oils. *Indian Food Packer.* 36(4); 1981; 11-5

Accelerated oven stability tests of soyabean oil and blends of 40% soyabean (40% soya) and 60% soyabean (60% soya) and groundnut oils were investigated by ageing the samples in an oven at 100 C for 9-13 days. The free fatty acid content (calculated as oleic acid) increased from 0.03 to 0.40% for imported soyabean oil, from 041-0.56% to 0.44-0.59% for soyabean oil blend with raw groundnut oil and from 0.10-0.12% to 0.23% for soyabean oil blend with refined groundnut oil. The peroxide value (m.eq./kg) increased from 5 to 108 for imported soyabean oil and from 6.0-8.8 to 10-12 and 4.4 to 20-40 for soya oil blends with raw groundnut oil and refined groundnut oil at 100 C respectively. Organoleptic acceptability was evaluated by a trained panel for every 24 hours of ageing. Rancidity and off flavours were noticed in soyabean oil and its blends with raw groundnut oil and refined groundnut oil after 9,7-8 and 7 days of ageing at 100 C respectively. Imported soyabean oil and its blend with raw groundnut oil have almost equal stability. AA

1636 BARUAH (KK), SAIKIA (A) and PATHAK (NN). Soyabean and pea as a sole source of protein in layer ration. *Poult. Guide.* 18(7); 1981; 49-50

Animal protein (e.g. fish meal) in a layer ration can be successfully replaced by a mixture of soyabeans (28% of the diet) and peas (10% of the diet). This result needs to be confirmed by a trial on a larger scale. If only soyabeans are used at 38% level, there is a marked drop in the feed intake and egg production of the birds. KMD

1637 PRESS (K), SHEELEY (RM), HURST (WJ) and MARTIN (RA) Jr. A comparison of high-performance liquid chromatography and proton nuclear magnetic resonance in determining the phosphatidylcholine content in soy lecithin. *J. Agric. Food Chem.* 29(5); 1981; 1096-8

While the HPLC method requires detection of phosphatidylcholine at 210 nm, the ^1H NMR depends on the resonance of choline at $\delta 3{,}3$. Data from both the methods had the same precision and showed good correlation between methods. BSN

1638 HITCHCOCK (CHS), BAILEY (FJ), CRIMES (AA), DEAN (DAG) and DAVIES (PJ). Determination of soya proteins in food using an enzyme-linked immunosorbent assay procedure. *J. Sci. Food Agric.* 32(2); 1981; 157-65

This report describes an immunoassay based on the more recent but well-established enzyme-linked immunosorbent assay (ELISA) procedure, which in this case is specific for soya proteins that have been solubilised in urea and then 'renatured' by removing or diluting the denaturant. Levels of soya protein 100 g^{-1} total protein (nominally 100%) were determined with 34 commercial soya products, using a standard reference antigen. Normal

expected levels were observed with flours (average 107%) and isolates (108%), while results with concentrates (82%) and texturates (79%) were somewhat lower. Some specialised products gave little or no response, presumably because they are hydrolysed. Meat, milk, egg, wheat and field bean proteins displayed negligible interference. These preliminary results suggest that the ELISA procedure will provide a convenient general method for the qualitative characterization and quantitative estimation of individual proteins in food products even after severe processing. AA

1639 GUNN (RA), TAYLOR (PR) and GANGAROSA (EJ). Gastrointestinal illness associated with consumption of a soy protein extender. *J. Food Prot.* 43(7); 1980; 525-7,529

In July and August 1976, an outbreak of acute gastrointestinal illness occurred among persons who had consumed a commercially marketed soy protein tunafish salad extender. After a public warning of a possible product contamination, representatives of 350 households reported 508 persons ill with an afebrile gastrointestinal syndrome that occurred usually within 1 hour after the salad-extender was eaten. Interviews of randomly selected reported ill persons (cases) showed that the principal symptoms were nausea (91%), abdominal cramps (71%), diarrhea (53%), headache (42%), difficulty in breathing (36%), and vomiting (22%). A survey of persons in the community who had eaten tuna extender revealed an illness attack rate (5.1%), which was significantly higher than the background incidence of gastrointestinal illness (1.1%) in persons who did not eat the tuna extender ($p < 0.05$). A case-control study showed that significantly more cases than controls had a history of "allergy" ($p < 0.02$). Tests of the product prepared by the manufacturer with volunteers implicated texturized soy protein as the cause of the illness. The findings in this study demonstrated that consumption of textured soy protein may elicit an adverse gastrointestinal response in a small but significant number of individuals, especially those with a history of "allergy." AA

RAPESEED

1640 MAHESWARI (PN), STANLEY (DW), BEVERIDGE (TJ) and Van de VOORT (FR). Localization of myrosinase (thioglucoside glucohydrolase, EC 3.2.3.1) in cotyledon cells of rapeseed. *J. Food Biochem.* 5(1); 1981; 39-61

Myrosinase (thioglucoside glucohydrolase, EC 3.2.3.1) activity in dehulled seeds of *Brassica napus* cultivar Tower, *B. campestris* cultivar Candle and *B. juncea* (oriental mustard) was localized by cyto-chemical and biochemical procedures. It was found to be associated with the plasmalemma (plasma membrane) in the majority of embryonic cells which is contrary to the general belief that myrosinase is found only in a few specialized idioblasts called 'myrosin cells'. The presence of lead and sulphur in electron-opaque deposits resulting from *in situ* myrosinase activity was confirmed by energy dispersive X-ray analyses. Association of myrosinase activity with the plasmalemma was also verified by fractionation and biochemical procedures. Although there were indications of some myrosinase activity in aleurone grains (protein bodies), the evidence was inconclusive. AA

PISTACIA NUT

1641 DANESHRAD (A) and AYNEHCHI (Y). Chemical studies of the oil from *Pistacia* nuts growing wild in Iran. *J. Am. Oil Chem. Soc.* 50(8); 1980; 248-9

The fruits of two species, namely, *Pistacia atlantica* Subspecies *mutica* and *P. atlantica* Subspecies *kurdica* are consumed by the natives because of the high content of oil in kernels and outer skin layers. The kernels of both species are rich in oil (over 50%), and the oil content in the outer skin layer of *P. atlantica* Subspecies *kurdica* is 63% and in the other variety 30%. Unsaponifiable matter and fatty acid compositions of the oils were determined and the results compared with the oil from *Pistacia vera*. AA

TUBERS AND VEGETABLES

1642 BHATIA (BS) and MUDAHAR (GS). Preparation and storage studies on some intermediate moisture vegetables. *J. Food Sci. Technol.* (India) 19(1); 1982; 40-43

Intermediate moisture (IM) vegetables (ii) mushrooms, (ii) cauliflower and (iii) carrots) were prepared with low (about 20%) and high (about 40%) moisture, with 8-10% salt content, by steeping overnight in 10% brine containing 0.1% potassium metabisulphite alone or with 0.2% citric acid, followed by draining and drying and stored at 19-26 C and 37 C after packing in 300 gauge LDPE pouches with an outer cardboard cover. The NaCl content in creased by 2.0 to 5.8%, and moisture content decreased by 3.1 to 8.7% depending upon the moisture content of the IM vegetable. In general, SO_2 decreased and the browning increased during storage. Browning was however, more in high moisture IM vegetables. The rehydration ratios ranged from (i) 1.6-2.7; maximum of 1.9, 2.6 and 2.3 were found in (ii) and (iii) respectively. The product had a shelflife of 3 months at 37 C. Use of KMS with citric acid was found better in place of KMS alone for dip treatment of IM vegetables. KAR

1643 RANGANATH (DR) and DUBASH (PJ). Loss of colour and vitamins on dehydration of vegetables. *Indian Food Packer.* 36(4); 1981; 4-10

The major (a) carotenoid pigments of (i) spinach leaves and (ii) sweet potatoes have been identified by GLC. Four major (a) (β-carotene, lutelin, vidaxanthin and neoxanthin) were present in (i). Changes in (a) and (b) and ascorbic acid content in (i) and (ii) as a result of dehydration and subsequent storage have been studied. In (i), losses of (a) may be reduced by 50% by dehydration at 55 C than at 90 C. After storage of dehydrated product at 24 C for 4 months, (b) in (i) was found to be only 22% of the fresh sample. In (ii), loss of (a) was 18-20%, while it was 36-39% in case of (b), during dehydration. After storage for 4 months, at 24 C, (ii) lost 18.0% of (a) and 48.5% of (b) respectively. BSN

1644 KARANTH (NGK), JAYARAM (M) and MAJUMDER (SK). Insecticidal residue in vegetables obtained from soil treated with hexachlorocyclohexane. *J. Food Sci. Technol.* (India) 19(1); 1982; 14-9

Technical hexachlorocyclohexane (HCH) powder was dusted at the rate of 5,10 and 25 Kg/ha to the soil which was ploughed,and seeds of coriander, amaranthus, carrot, knol-khol, chilli, cucumber and tomato were sown. The residue levels of alpha, beta, gamma and delta isomers of HCH in their edible parts were estimated after harvest. Among the vegetables, the decreasing order of HCH uptake was: coriander, amaranthus, carrot, knol-khol, chilli, cucumber and tomatoes. The level of insecticide in the tissue of the same plant is not in direct proportion to the concentration of the insecticide in the soil. The residue level in plants did not exceed the tolerance limits established for human consumption. KAR

1645 FRANK (HK). Patulin in products of vegetal origin. *Confructa.* 25(3/4); 1980; 107-18

Patulin can be formed in fruits and vegetables when they are attacked by patulin forming moulds. The mould infection can be reduced to a large extent by a fungicide treatment or post harvest treatment. Since there are many mycotoxins, besides patulin, one should avoid taking food infected by moulds. *Penicillium expansum, Penicillium patulum* are the patulin forming moulds. The acute toxicity of patulin is relatively great. Its tolerance limit is 50 ppb. It has been established recently that oral dosage of patulin does not produce any carcinogenic effect. VR

CARROT

1646 SCHALLER (A) and VAMOS-VIGYAZO (L). Results of studies on quality changes of unblanched versus blanched, deep-frozen carrot cubes during frozen storage at 255K. *Confructa.* 25(3/4); 1980; 87-106 (German)

The findings established upto now indicate that under certain conditions of processing, blanching may be omitted if a raw material of good quality is used. It has also been concluded that blanching did not improve or stabilize significantly either the flavour quality or the colour (brightness, hue and saturation) of the prepared product. Similarly, no other microbiological-hygienic advantages resulted from it. As regards the concentration of total carotenoids as well of total carotenes, the significant stabilizing effect of blanching proved unimportant. VR

POTATO

1647 SCHALLER (A), BERGTHALLER (W) and GABRIEL-BLANKE (E). Results of investigations relating to the influence of water-blanching on colour of dehydrated potato cubes during a short-time storage with special consideration of brightness. *Confructa.* 25(3/4); 1980; 119-31 (German)

From the results of variance analysis regarding the influence of blanching time (75 to 300 seconds), storage time (1-29 d) and their interaction on the colour (a,b,L-colour space) of dehydrated potato cubes, it can be seen that this multiple correlation could be described by second order polynomials neglecting the interaction (blanching time x storage time). Compared with blanching (decreasing brightness with increasing blanching time), the short-time storage for about one month had a much smaller influence on the brightness of potato cubes. VR

1648 KAUR (B) and GUPTA (SK). Utilization of potato for weaning food manufacture. *J. Food Sci. Technol.* (India) 19(1); 1982; 23-5

Briefly the process consists of boiling of potatoes, peeling, mashing, addition of soyabean and skim milk followed by sieving the slurry and subsequent roller drying after pasteurization. Of the four combinations i.e. 65:35:0; 65:30:5; 65:25:10 and 65:20:15 of potato, soyabean, cotyledons and skim milk solids, the last combination had the highest protein efficiency ratio of 1:9. The powdered product after reconstitution with 3.5 parts of water, sweetened with 10% sugar and flavoured with strawberry was acceptable. KAR

1649 COCHRANE (WP) and LANOUETTE (M). High pressure liquid chromatographic determination of aldicarb, aldicarb sulphoxide, and aldicarb sulphone in potatoes. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 724-8

1650 MISRA (SS), LAKSHMAN LAL and AWASTHI (MD). Persistence of aldrin and dieldrin residues in potatoes. *J. Food Sci. Technol.* (India) 19(1); 1982; 11-4

Aldrin EC was sprayed on the ridges and foliage of potato plant at the rate of 1.75, 2.00, 2.25 and 2.50 kg active ingredient per hectare 25 days after planting (single spray) and repeating after 25 days after the first spray (double spray) at the same doses to control cut worms (*Agrotis* spp.). In unpeeled and unwashed potatoes, the residues of aldrin and dieldrin persisted above the tolerance limit of 0.1 ppm. Peeling followed by washing or boiling and peeling of such potatoes remove the toxicants to a considerable extent, but failed to remove the toxicants completely. AA

SWEET POTATO

1651 WALTER (WM) Jr. and SCHADEL (WE). Distribution of phenols in "Jewel" sweet potato (*Ipomoea batatas* (L) Lam) roots. *J. Agric. Food Chem.* 29(5); 1981; 904-6

"Jewel" cultivar sweet potato roots were dissected into cross sections representing proximal (stem), middle (midroot), and distal (root) segments. Tissue from each segment was divided into skin, secondary tissue external to the cambium (outer; ~5-mm diameter), and secondary tissue internal to the cambium (inner). The quantity of phenolics for these tissue segments was measured by using a single-pump liquid chromatograph equipped with an inexpensive gradient-forming device. Phenolics decreased in the order outer > skin > inner. The phenol levels of the inner tissue were uniform throughout the root, while the outer tissue of the stem and root ends were found to contain more phenolics than the midroot outer tissue. Thus, ~78% of the phenolics were found to be localized in the skin and outer 5 mm of tissue. AA

ALFALFA

1652 WHEELER (EL) and FINLEY (JW). Lipoxygenase in the expressed juice of alfalfa leaves. *J. Agric. Food Chem.* 29(5); 1981; 912-4

Alfalfa (*Medicago sativa*) green juice showed greater activity of lipoxygenase than from previously reported sources. *tert*-butylhydroquinone and BHT inhibited 100% activity of lipoxygenase under the experimental conditions employed. Lower lipoxygenase activity observed in protein concentrates obtained from green juice may be due to the addition of antioxidants added. BSN

1653 TOZZI (MG), BALESTRERI (E), CAMICI (M), FELICIOLI (R) and IPATA (PL). Partial purification and characterization of a proteolytic activity of alfalfa juice. *J. Agric. Food Chem.* 29(5); 1981; 1075-8

The proteolytic activity of alfalfa (*Medicago sativa*) press juice has been partially purified by a combination of ammonium sulphate precipitation, gel filtration of Sephadex G-100 and Sephadex G-200, and ion-exchange chromatography on DEAE-cellulose. The enzyme shows a pH optimum between 7 and 9. The optimum temperature is close to 45 C. The activity is strongly inhibited by acetylleucylleucylargininal (Leupeptin). The enzyme is insensitive to chelating agents and to sulphhydryl group reagents. This protease probably accounts for the disappearance of some proteins from alfalfa juice during storage AA

ARTICHOKE

1654 RODRIGO (M), SAFON (J), LORENZO (P), NAVARRO (A) and VAYA (JL). Agricultural and industrial characteristics of artichoke cultivars. Influence of harvesting conditions on yield and quality. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 498-512 (Spanish)

Agricultural and industrial characteristics of five spanish artichoke cultivars (*Murial Amposta Tudela*, San Juan de Enova and Tudela x Amposta) are determinated and the influence of harvesting conditions on both the yield and the quality of fruits for industry is studied. The study is carried out during three seasons. In all cultivars two well-differentiated harvesting periods have been observed: the first one ("Primer calmo"), from November to beginning of March, accounts for 15.25% of total production and the fruit harvested are more suitable for the fresh market, while the second one ("segundo colmo") from April to June is more productive (75.85%) of total and gives fruits of better quality for industry. Cultivars Tudela x Amposta and San Juan de Enova are more productive and early, their plants are higher and their industrial yields are greater. All cultivars show good yield in canning and good quality canned products. These characteristics grow worse for two year old plants while precocity increases. A good result is obtained which harvesting every six days all artichokes of diameter higher than 4 cm. Harvesting intervals of three of nine days are less adequate. AA

TOMATO

1655 BANDLER (R) and CICHOWICZ (SM). Particle size and concentration adjustments of tomato products for Howard Mold Count. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 576-73

The proposed method standardizes both the particle size of the tomato material and the concentration, modifying only the sample preparation section of the official method. Mean mold counts for the proposed method were significanlty greater than those for the official method ($p < 0.05$), because of the inclusion of blending in the proposed method. Collaborative study results showed equal repeatability for both the official and the proposed methods and a lower coefficient of variation for the proposed method. VR

1656 KARANTH (NGK), JAYARAM (M) and MAJUMDER (SK). Phytotoxicity of X-factor. *Pesticides.* 15(4); 1981; 7-10

Growth of tomato was retarded by X-factor as well as by premium grade X-factor (by products obtained from lindane plant) resulting in phytotoxicity. French bean, brinjal and ragi were not, however, affected by them. Presence of X-factor led to reduction in growth of paddy. The half life of chemicals was calculated to be about 20 days. BSN

FRUITS

1657 BOLIN (HR), HUXSOLL (CC) and SALUNKAE (DK). Fruit drying by solar energy. *Confructa.* 25(3/4); 1980; 147-60 (German)

Different methods of fruit drying using solar energy have been mentioned: black trays, solar trough, solar heated cabinet drier, polytube drier, polyethylene semi-cylinder are some of the methods, which have been discussed in detail. KMD

1658 PEARSON (TW), DAWSON (HJ) and LACKEY (HB). Natural occurring levels of dimethyl sulphoxide in fruits, vegetables, grains and beverages. *J. Agric. Food Chem.* 29(5); 1981; 1089-91

Fruits (apple, orange, peach, raspberry), vegetables and forage (alfalfa, bean cabbage, corn, cucumber, oats, onions, Swiss chard (*Beta vulgaris* variety *cicla*), tomatoes) and beverages (beer, coffee, milk, tea) showed the presence of dimethyl sulphoxide (Me_2So) ranging from trace to 16.0 ppm (black tea leaves). Alongwith Me_2SO, the dimethyl sulphone (Me_2SO_2) oxidized product was found from trace to 0.86 ppm in tomato. BSN

BERRY

1659 ERNE (K). Studies of phenoxy herbicide residues in woodland berries and mushrooms. *Var Foda.* 32(5); 1980; 285-92

During 1973-1979, 171 samples of woodland berries, berry products, and mushrooms were analyzed for phenoxy herbicide residues, by TLC and GC (detection limit 0.05-0.1 µg/g). No phenoxy acids were detected in 61 samples of cowberries (*Vaccinium vitis-idaea*) and bilberries (*Vaccinium myrtillus*) intended for industrial processing and manufacture of jam sold in supermarkets. Low levels of phenoxy acids were found in 22 out of 103 samples of cowberries, bilberries, raspberries (*Rubus idaeus*), cloud berries (*Rubus chamaemorus*) and a few others; but in six samples of *Vaccinium* berries, the 2,4-D content exceeded the FAO/WHO limit of 5 µg/g. Such berries also had an abnormal appearance, and a distinct off-taste, and were unsuitable for consumption for these reasons alone. Six samples of forest mushrooms, suspected of contamination, were free from phenoxy acid residues; but one sample from a herbicide -sprayed lawn contained traces of 2,4-D. KMD

BANANA

1660 AREAS (JAG) and LAJOLO (FM). Starch transformation during banana ripening. I. The phosphorylase and phosphatase behaviour in *Musa acuminata*. *J. Food Biochem.* 5(1); 1981; 19-37

CITRUS

1661 CATALA (R), DURAN (L) and GINER (V). Reduction of flavour and colour changes in citrus (satsuma) segments canned in lacquered cans. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 533-40 (Spanish)

Several possible solutions are studied in order to reduce the undesirable changes in flavour and colour, undergone by Satsuma segments, when lacquered cans are used for canning. Use of lacquered cans with an unlacquered band (2 cm wide) around the centre of the can body or addition of 50 ppm of stannous ion ($SnCl_2$) reduces the above mentioned changes to a satisfactory level. AA

1662 CUNAT (P) and CASAS (A). Fungicidal treatments to avoid post-harvest changes in citrus fruits. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 423-34 (Spanish)

The authors have reviewed the post-harvest infections that may attach citrus fruits in Spain, and discussed the use of six well-known fungicides - orthophenylphenol, thiabendazole, benomyl, 2-aminobutane, imazalil, and guazatine - against such infections. KMD

GRAPE FRUIT

1663 KING (JR), BENSCHOTER (CA) and BURDITT (AK) Jr. Residues of methyl bromide in fumigated grapefruit determined by a rapid headspace assay. *J. Agric. Food Chem.* 29(5); 1981; 1003-5

The rapid method consists of blending 50g grapefruit samples with water and estimation of headspace by GC equipped with a gas sample injection valve and a nickel-63 electron capture detector. Sensitivity (twice the background for samples of unfumigated grapefruit) was 0.002 mg/kg. Partioning of MB into headspace was done by using grapefruit samples which had not been fumigated, but fortified at various MB levels. BSN

KUMAQUAT

1664 DABHADE (RS) and KHEDKAR (DM). Kumquat: Good for processing. *Indian Food Packer.* 36(4); 1981; 29-31

Among the citrus fruits, the smallest sized fruits are the Kumaquat (*Citrus Japonica*). An attempt has been made to study the physico-chemical constituents (weight, breadth, pulp percentage, peel percentage, seed percentage, rag percentage, shape index, sp. gr. of juice, total soluble solids, acidity, ascorbic acid, reducing sugars, total sugars and juice percentage), with the object of preparing (i) squash, (ii) comminuted beverage and (iii) marmalade. Kumquat is rich in ascorbic acid (56.00 as against 20.71 for Nagpuri mandarin and 32.97 mg/100g for Lahore local mandarin) and acid content of 6.08 as against 4.10 and 4.00% for Nagpuri mandarin and Lahore local mandarin respectively. A brief account is given about the preparation of (i), (ii) and (iii) from kumaquat. BSN

ORANGE

1665 CASAS (A), RODRIGO (MI) and MALLENT (D). Prevention of the accumulation of the precursor of limonene in Washington Navel oranges, during treatment of the trees with triethylamine derivatives. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 513-9 (Spanish)

Limonene imparts a bitter taste to the juice of Washington Navel and other varieties of oranges. Hence 3 chemicals were sprayed on orange trees at levels of 200 ppm and 300 ppm to study their effect on the limonene content of the oranges. Only two of these chemicals, viz. 2-(3,4-dimethylphenoxy) triethylamine and 2-(4-chlorophenylthio)-triethylamine at 200 ppm levels could reduce the limonene content below that of the controls. The differences decreased with advancing maturity. The chemical treatments also caused a small decrease in total soluble solids and acidity of the fruits. KMD

MANGO

1666 VAN PEE (W), BONI (L), FOMA (M), HOYLAERTS (M) and HENDRIKX (A). Positional distribution of the fatty acids in the triglycerides of mango (*Mangifera indica*) kernel fat. *J. Am. Oil Chem. Soc.* 50(8); 1980; 243-5

Triglycerides of mango seed kernel fat contain depending on the variety, 32.4-44.0% of stearic acid and 43.7-54.5% of oleic acid, Palmitic and linoleic acids represent, respectively, 5.9-9.1% and 3.6-6.7% of the fatty acids. The triglycerides also contain minor amounts of arachidic and

linolenic acids. Palmitic, stearic and arachidic acids were almost exclusively distributed among the *sn*-1-and *sn*-3-positions. Oleic acid represented 85-89% of the fatty acids at the *sn*-2-position. Oleic acid at the *sn*-1- and *sn*-3-positions showed a preference for the *sn*-1-position. Linoleic acid was mainly esterified at the *sn*-2-position. The amounts of saturated fatty acids, i.e. palmitic and stearic acids, and of oleic acid, at the *sn*-1- and *sn*-3-positions, were linearly related to their respective contents in the total triglycerides. AA

PEACH

1667 VYAS (KK) and JOSHI (VK). Canning of fruits in natural fruit juices. I. Canning of peaches in apple juice. *J. Food Sci. Technol.* (India). 19(1); 1982; 39-40

(1) Apple juice concentrate (73° Brix and 2.0% acidity) after dilution with water in 1:6 ratio and (ii) straight apple juice (10° Brix and 0.31% acidity) were adjusted to 42° Brix and 0.2% acidity and used as covering media to can free stone peaches and compared with those canned in (iii) sugar syrup. Organoleptic analysis of the product indicated that the flavour and taste of the peaches canned in (i) were highly acceptable, that the apple flavour had not masked the peach flavour and that use of apple juice in addition to contributing towards nutritive value, thus resulting in reduction of sugar required, by 25%. KAR

APPLE

1668 DRAUGHON (FA), LINK (MA) and AYRES (JC). Inhibition of patulin production with the insecticide naled. *J. Food Prot.* 43(7); 1980; 575-8

Production of patulin in apples was inhibited by 76% and tissue damage inhibited by 43% when 100 mg of naled/1 was applied to apples before their inoculation and storage at 25 C. Naled was highly effective in inhibiting patulin production and showed long-term activity. However, naled completely inhibited patulin production only when applied before growth of the fungus. AA

SUGAR, STARCH AND CONFECTIONERY

1669 LORUSSO (S). Influence of the EEC regulations on the production and consumption of sugar in Italy. *Ind. Aliment.* 19(175); 1980; 679-84 (Italian)

1670 HAMMOND (CSR) and WREN (JJ). Estimation of fermentable sugars and attentuation limit by an enzymic method. *J. Inst. Brew.* 87(2); 1981; 87

1671 FORD (CW). Estimation of hexose: Pentose ratios in solution using the phenol-sulphuric acid method. *J. Sci. Food Agric.* 32(2); 1981; 153-6

A procedure is described whereby the proportion of hexose: pentose in solution may be determined spectrophotometrically. The method uses the phenol-sulphuric acid reaction and a previously unreported ultraviolet adsorption band at 312-325 nm in the reacted solutions. The λ_{max} of this band increases with, and is linearly related to, the ratio of hexose to total sugars in the mixture, in the range 10-80% hexose. AA

1672 GOODWIN (JC) and HODGE (JE). Sweetness and bitterness of some aliphatic α, ω- glycol D-glycopyranosides. *J. Agric. Food Chem.* 29(5); 1981; 935-8

1673 BUCHHOLZ (K), PULS (J), GODELMANN (B) and DIETRICHS (HH). Hydrolysis of cellulosic wastes. *Process Biochem.* 16(1); 1980-81; 37-43

BAKERY PRODUCTS

BREAD

1674 BERMELL (S) and BARBER (S). Liquid pre-ferments for the industrial production of bread. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 459-68 (Spanish)

Pre-ferments are nothing more than an yeast culture. The authors have reviewed the ingredients and formulations used for the preparation of pre-ferments, the changes that occur in the microflora and chemical composition of dough during prefermentation, as also the factors that influence such changes. KMD

1675 THEWLIS (BH). The fate of stearoyl lactylates when used in breadmaking. *J. Sci. Food Agric.* 32(2); 1981; 125-8

The composition of four different commercial stearoyl lactylate samples has been determined by methylation followed by gas-liquid chromatography. Components present included lactic, palmitic, stearic, palmitoyl lactic and stearoyl lactic acids. When the samples were used in baking bread their components became bound to starch but could be recovered almost quantitatively after treatment with α-amylase, showing that they remained unchanged during baking. AA

MILK AND DAIRY PRODUCTS

MILK

1676 MUELLER (JS) and BRADLEY (RL) Jr. Loss of phthalic acid ester from polyvinyl chloride tubing into various fluids. *J. Food Prot.* 43(7); 1980; 551-4

1677 WEJWODA (S), FISCHER (J), BEHNKE (V) and SCHELLENBERGER (A). Coagulation of milk with polystyrene-rennin-derivatives. *Nahrung.* 24(3); 1980; 309-15 (German)

Rennin was immobilized on macroporous styrene-divinylbenzene copolymerisates by different methods. The operational stability of the prepared polystyrene-rennin derivatives in the coagulation of milk was investigated in the batch reactor as well as in the column reactor. The results show that at half value periods of Ca 8 hours in the packed column reactor, no absolutely stable linkages between carrier and enzyme were found. AA

1678 LAKRITZ (L) and PENSABENE (JW). Survey of fluid and nonfat dry milks for N-nitrosamines. *J. Dairy Sci.* 64(3); 1981; 371-4

A limited survey of milk and dairy products was undertaken to determine the presence of volatile N-nitrosamines, a class of compounds carcinogenic to a broad range of animal species. Nitrosamines were detected and quanti-

tated by a gas liquid chromatograph interfaced with a Thermal Energy Analyzer. Detectable N-nitrosodimethylamine, the only nitrosamine found, ranged from .05 ppb for whole milk to .30 ppb for nonfat dry milk. No N-nitrosodimethylamine was detected in raw milk, whereas 11 of 21 samples of pasteurized milk contained apparent N-nitrosodimethylamine at a mean .10 ppb. N-nitrosodimethylamine also was detected, but not confirmed by mass spectrometry, in evaporated and condensed milk with means .32 ppb and .58 ppb and in 9 of 10 nonfat dry milk samples with a mean of 1.69 ppb. Upon reconstitution condensed milk and nonfat dry milk contained N-nitrosodimethylamine comparable to that in pasteurized milk. No N-nitrosodimethylamine was detected in cultured milk products such as buttermilk and yogurt. AA

679 ANDERSSON (RE), DANIELSSON (G), HEDLUND (CB) and SVENSSON (SG). Effect of a heat-resistant microbial lipase on flavour of ultra-high-temperature sterilized milk. *J. Dairy Sci.* 64(3); 1981; 375-9

A heat-resistant microbial lipase was added to cows milk in different concentrations. After sterilization in a Vacu-Therm Instant Sterilizer the milk was cold-stored at 8 C for 22 days. The acid degree value and flavour changes were followed during storage. The samples containing lipase showed a rapid increase in acid degree value as compared to the reference. The lipase also had a pronounced effect on formation of rancid flavour. The sample with the highest enzyme activity, about .3 units/ml, was perceived as "rancid" after 5 to 8 days. Significant flavour changes appeared in all samples when the acid degree value exceeded 20. AA

680 STEMBERGER (BH) and PATTON (S). Relationships of size, intracellular location, and time required for secretion of milk fat droplets. *J. Dairy Sci.* 64(3); 1981; 422-6

681 FAMULA (TR) and VAN VLECK (LD). Sire evaluation by only extended partial milk and fat records. *J. Dairy Sci.* 64(3); 1981; 484-90

682 BRADLEY (RL) Jr., MYRDAL (GR) and ALIOTO (P). Measurement of milk fat in low-fat chocolate milk. *J. Dairy Sci.* 64(3); 1981; 520-22

Deviations in measurement of milk fat allow that the Mojonnier procedure is the only reliable method for low fat chocolate milk. Other methods invariably give high results that could present legal complications. Calculations show the amount of additional milk fat needed in raw milk before addition of a cocoa mixture and sugar to hold the concentration of milk fat above 2.0%. AA

683 GUROV (AN), LOZINSKAYA (NV), POTESHNIKH (AV) and TOLSTOGUZOIV (VB). Interaction of casein with diethylaminoethyl-dextran in aqueous solutions. Isolation of α_s-caseins. *J. Dairy Sci.* 64(3); 1981; 380-83

684 CHASSIGNON (F), POTERRE (P) and JACQUET (B). Research on the methods of evaluation of the functional properties of food protein additives. II. Consistency and losses of caseinate emulsions after pasteurization or sterilization. *Ind. Alim. Agric.* 97(6); 1980; 559-64 (French)

Emulsions were prepared from 7 caseïnates and their characteristics studied, both before and after pasteurization or sterilization, as well as before and after storage for 3 days. As cuttering time increases, one observes differences in the temperature increase of the various emulsions. The final temperature of each emulsion can be used to classify the different caseinates. A similar result was found for the pH-values. The final cuttering temperature is closely related to the viscosity of the fresh

emulsion (r = 0.98). When cooked or sterilized products are classified according to consistency, the result is similar to that obtained with fresh products. KMD

1685 MURTHY (GK) and PEELER (JT). Determination of alkaline phosphatase in casein: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 623-7

1686 FREIMUTH (U) and KRAUSE (W). On the alkali treatment of proteins. Part 3. Dephosphorylation of acid caseins and casein fractions in an alkaline medium. *Nahrung.* 24(3); 1980; 317-26 (German)

The extent and the velocity of alkali-induced dephosphorylation were determined in dilute solutions of α_s-, β- and acid casein in the pH range 10.0 to 12.0. Whereas the degree of dephosphorylation of all three proteins studied did not exceed 2% of the total phosphorus for 24 hours at temperatures below 30 C and pH values below 11.0, a rise in temperature increased the rate of reaction and the degree of conversion considerably. The half lifes for dephosphorylation found for α_s-, β- and acid casein were 350 minutes, 340 minutes and 190 minutes at pH 12.0 and 90 C. At the same time upto 18% of non-protein nitrogen was released. After protein precipitation with trichloroacetic acid, more than 90% of the split-off phosphorus is detectable as free inorganic phosphorus in the supernatant. The rest is bound to be soluble peptides. AA

1687 VAN OS (JL) and BEUKERS (R). A multitest system for detection of antibiotics in milk. *J. Food Prot.* 43(7); 1980; 510-11,519

1688 OLSEN (RL) and RICHARDSON (GH). A flooded plate loop count procedure. *J. Food Prot.* 43(7); 1980; 534-5

1689 EL-BASSIONY (TA). Occurrence of *Clostridium Perfringens* in milk and dairy products. *J. Food Prot.* 43(7); 1980; 536-7,542

1690 ISMAIL (AA) and EL-NIMR (AA). Quantitative changes in carbohydrates and acidity during manufacture of low-lactose zabadi. *J. Food Prot.* 43(7); 1980; 566-7

B-galactosidase from *Saccharomyces lactis* was used to hydrolyze lactose in buffalo milk from which Zabadi was made. The lactose content of Zabadi samples decreased with increasing the amount of β-galactosidase used for hydrolysis of the buffalo milk from which Zabadi was made. Also, higher product scores were given to Zabadi samples made from treated milk that contained 28.4% and 4.6% of the initial lactose after hydrolysis with 0.89 g or 1.6 g enzyme/1, respectively. AA

YOGURT

1691 SOZZI (T) and SMILEY (MB). Antibiotic resistances of yogurt starter cultures *Streptococcus thermophilus* and *Lactobacillus bulgaricus*. *Appl. Environ. Microbiol.* 40(5); 1980; 862-5

CHEESE

1692 TORRES (N) and CHANDAN (RC). Latin American white cheese. A review. *J. Dairy Sci.* 64(3); 1981; 552-7

Discusses: methods of manufacture; composition; keeping quality; uses; and ripening. BSN

1693 HICKS (CL), O'LEARY (J) and LANGLOIS (BE). Equipment and procedure for manufacturing laboratory cheese curd. *J. Dairy Sci.* 64(3); 1981; 523-5

A technique for manufacturing laboratory quantities of cheese is described. This technique allows simultaneous manufacture of four vats (7 kg each) of milk. Cooling and stirring procedures were automated to reduce variability between vats. A direct acid cheese procedure minimized cheese make time and unified the make procedure. The equipment was acceptable for producing Cheddar cheese, cottage cheese, and direct acid set cheese. This equipment would be especially suited to evaluate compatability of enzymes for cheese manufacture, cheese yield, studies, desirability of cultures for a particular cheese type, and test of culture media. AA

MEAT AND POULTRY

1694 TOBIOKA (H) and KAWASHIMA (R). Gas-liquid chromatographic determination of hexestrol residues in adipose tissue. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 709-13

1695 KRUGGEL (WG), FIELD (RA), RILEY (ML), RADLOFF (HD) and HORTON (KM). Near infrared reflectance determination of fat, protein and moisture in fresh meat. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 692-6

Estimations of crude protein, fat and moisture in meat were obtained with the infraAlyzer and compared with results obtained with the kjeldahl method for crude protein determination, the Goldfisch method for fat extraction and the oven drying method for moisture. Multiple correlation coefficients for fat ranged from 0.91 - 0.94 in emulsified meat and from 0.83 -- 0.85 in ground meat; for moisture 0.90-0.94 and 0.83-0.85 respectively and for protein 0.80-0.85 and 0.72-0.77 respectively. Near infrared reflectance shows promise as a rapid method for determining composition of meat. Nevertheless, some aspects of this method require further attention. VR

1696 FUCHS (G) and KUIVINEN (J). Examination of mixed meat products in school meals. *Var Foda.* 32(5); 1980; 124-9

The main purpose of the present investigation was: to control if the standardized products fulfil the requirements stated by Swedish regulations; to control if the non-standardized products fulfil the requirements concerning the voluntary nutrition declaration stated by the Swedish National Food Administration and to examine the nutritional quality of the protein. 108 samples from 31 rural districts in Sweden were examined. The content of water, fat, protein, ash, iron and connective tissues were determined. The standardized products fulfilled the requirements. Divergencies from declared nutrition value were observed in a few cases. The protein in the standardized sausages and in the minced meat products showed good nutrition quality. AA

1697 OBLINGER (JL) and KENNEDY (JE) Jr. Microbiological evaluation of selected delicatessen meats from retail supermarkets. *J. Food Prot.* 43(7); 1980; 530-33, 535

1698 HAUSCHILD (AHW) and HILSHEIMIER (R). Incidence of *Clostridium botulinum* in commercial bacon. *J. Food Prot.* 43(7); 1980; 564-5

Of 416 75 gram samples of commercial bacon cultured with or without prior heating, only one gave rise to formation of botulinal toxin. The

most probable number of *Clostridium botulinum* was estimated at 0.064 per kg with a 99% confidence limit of 0.0004 to 0.478 per kg. AA

1699 MURTHY (TRK) and BACHHIL (VN). Comparison of pour plate with overlay and spread plating for enterobacteriaceae count in minced meat. *J. Food Sci. Technol.* (India) 19(1); 1982; 37-9

Enterobacteriaceae counts were enumerated in retail samples of ground mutton and sausage meat using Violet Red Bile Glucose agar medium. Two methods of plating the selective medium viz. pour plate with overlay and spread plating were compared. Spread plating showed higher recovery of enterobacteriaceae counts. AA

1700 POIRE (G) and CANTONI (C). "Mortadella". an Italian typical dry salami. *Ind. Aliment.* 19(175); 1980; 676-8 (Italian)

The chemical and bacteriological data and the way of Mortadella processing have been reported. Mortadella is an Italian typical salami without nitrates and nitrites addition. AA

1701 HOFMANN (HP) and SCHARNER (E). Microbiological and organoleptic studies on the maturing dynamics of raw sausages (matured). Part 1. Microfloral changes during maturation. *Nahrung.* 24(3); 1980; 285-93 (German)

The determination of microbiological parameters of sausages (matured) produced in the GDR is necessary for the future development of the meat processing industry in the GDR and for the use of starter cultures. Microbiological studies were made on raw sausages of varying stages of maturity (prior to, and after 3 and 6 weeks of maturing) from four selected raw sausage factories. The maturing dynamics of raw sausage production was studied ed microbiologically by determining the number of aerobically growing germs and of the most important groups of bacteria (aerobic spore forming bacteria, micrococci, lactobacilli, coliforms). The dominant role of the lactobacilli and the lactobacilli-coliforms antagonism was evidenced. In spite of differing maturing techniques in the factors, similar processes of maturing were observed, so comparative microbiological quality controls of raw sausages (matured) seem suited for contributing to the stabilization of raw sausage production. AA

BEEF

1702 QUAGLIA (GB) and TASSELLI (F). Study of the influence of chemical and physical parameters on the ultrafiltration of bovine blood plasma. *Ind. Aliment.* 19(175); 1980; 671-5 (Italian)

Ultrafiltration is becoming more important in food industry as an effective way of purification and concentration, as it becomes possible to control the temperature at required levels. This paper is an investigation of the parameters affecting the efficiency of the operation in the case of ultrafiltration of bovine blood-plasma. AA

1703 PINAGA (F), CARBONELL (JV), VALLES (S) and AMPARO FERIA (M). Pasteurization of precooked dishes. II. Quality changes in refrigerated storage of a beef goulash packed in normal air. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 520-32 (Spanish)

Two samples of beef goulash were prepared; sample I was filled at 95 C , and sample II was made by mixing solid components at 0-3 C with sauce at 95 C. The product was packed into aluminium trays and then inoculated with three different organisms at the rate of 100,000 microorganisms/g.

After sealing, the trays were pasteurized for 3 and 10 minutes, in water at 95 C. Uninoculated, hot-filled samples with and without antioxidants were also studied. In the hot-filled samples (I), the microbial load came down to 200 microorganisms/g. The same reduction could be obtained in the samples II only by pasteurizing the product for 10 minutes in water at 95 C In all samples, total plate count decreased as refrigerated storage time increased. Samples treated with antioxidant and stored at 0-3 C for 4 weeks had the same organoleptic acceptability as the reference samples stored at -18 C for the same period. KMD

1704 BRYAN (FL) and McKINLEY (TW). Hazard analysis and control of roast beef *Jus* preparation in food service establishments. *J. Food Prot.* 43(7); 1980; 512-3

1705 NICHOLS (JE) and CROSS (HR). Effects of electrical stimulation and early postmortem muscle excision on pH decline, sarcomere length and colour in beef muscles. *J. Food Prot.* 43(7); 1980; 514-9

1706 SMITH (LB), BUSTA (FF) and ALLEN (CE). Effect of rising temperatures on growth and survival of *Clostridium perfringens* indigenous to raw beef. *J. Food Prot.* 43(7); 1980; 520-24, 529

1707 GREER (GG) and JEREMIAH (LE). Influence of retail display temperature on psychrotropic bacterial growth and beef case - life. *J. Food Prot.* 43(7); 1980; 542-6,554

1708 FUNG (DYC), KASTNER (CL), HUNT (MC), DIKEMAN (ME) and KROPF (DH). Mesophilic and psychrotrophic bacterial populations on hot-boned and conventionally processed beef. *J. Food Prot.* 43(7); 1980; 547-50,554

1709 CROSS (HR), NICHOLS (JE) and KOTULA (AW). Effect of grinding method on textural properties of cooked ground beef. *J. Food Prot.* 43(7); 1980; 555-7

Effects of eight grinding methods on textural properties of cooked beef patties were tested on beef from two sources. The methods tested were representative of those used by processors throughout the country and the sources were U.S. Choice chucks and U.S. Utility grade triangles. Patties from the .32 x .32 cm and silent cutter methods scored highest for tenderness and were lowest in amounts of subjectively determined connective tissue for both Choice and Utility grade beef. Sensory panel and Instron means indicated that the size of plate for initial grind was related ($P < .10$) to tenderness and the amount of connective tissue in the final product. Patties prepared by the 2.54 x .32 cm grinding method were generally inferior to patties prepared by the .32 x .32 cm grinding method. AA

1710 ANDERSON (ME), MARSHALL (RT), STRINGER (WC) and NAUMANN (HD). In-plant evaluation of a prototype carcass cleaning and sanitizing unit. *J. Food Prot.* 43(7); 1980; 568-70

An experimental cleaning and sanitizing unit was used in cleaning and sanitizing (3.0% acetic acid) beef carcasses. The sanitizing unit reduced the microbial population on the surface of the meat by an initial 1.49 logs; the difference between washed and washed and sanitized carcasses after 1 week (168 hours) was 0.92 log. A slight gray cast developed within the top 1 mm of fat almost immediately after the acid was applied. Sensory panel members detected no adverse effects on the lean portion of steaks from sanitized carcasses. However, they detected a slight off-flavour in treated fat. AA

POULTRY

1711 SHERIFF (FK). What to do with egg-type male chicks. *Poult. Guid.* 18(7); 1981; 57-8

It is suggested that the male offspring of egg-laying breeds of chickens could be profitably grown for meat up to the age of 10-12 weeks on a diet containing 23-26% and 2400 kcal/kg ME. If slaughtered at the age of 8-10 weeks, they would be useful for making "tandoori" chicken (i.e. dry, oven-roasted chicken), fried chicken, or chicken curry. KMD

1712 MORENO (B), CALLES (A) and DIEZ (V). Influence of pH and lactic acid on occurrence of non-specific zones of growth inhibition during determination of antibiotic residues in chicken muscle. *J. Food Prot.* 43(7); 1980; 558-60

1713 SHARMA (N), KOWALE (BN) and JOSHI (HB). Effect of cooking and storage on phospholipids in broiler. *J. Food Sci. Technol.* (India) 19(1); 1982; 1-6

Phospholipids from thigh and breast muscles stored at 4 and -10 C were fractionated by thin layer chromatography. Breast muscle had more phospholipid than thigh muscle. Phosphatidyl choline and phosphatidyl ethanolamine were the predominent phospholipids. Presence of lysophosphatidyl ethanolamine fraction was noted in lipid of broiler. Cooking and storage decreased all the phospholipids with simultaneous increase of free fatty acids and TBA values. The rate of decrease in phospholipid was more at 4 C than at -10 C of storage. KAR

1714 NATARAJAN (P) and SIDDIQUI (SM). Study on certain selected quality characteristics of fresh and stored, processed broilers. *Indian Poult. Gaz.* 65(3); 1981; 93-9

Thirty broilers, aged about 10 weeks were processed, packed in 200-guage polyethylene bags and subjected to chilling for 50 hours and 100 hours, and to frozen storage for 30 days and 60 days, and their physico-chemical properties, proximate principles, thiobarbituric acid (TBA) values, microbiological condition, and organoleptic quality were measured and assessed. The pH of both raw and cooked meat, and of light and dark meat, increased during storage. Significant changes were observed in ash content, but not in any other parameters of the proximate composition. TBA values increased, but not to such an extent as to suspect rancidity. Microbiological and organoleptic quality were found to be good. The findings suggest a satisfactory shelf-life of up to 100 hours in chilled storage (4 C, 85% RH), and upto to 60 days in frozen storage (18 C, 95% RH). KMD

1715 SHARMA (N), KOWALE (BN) and JOSHI (HB). Effect of cooking and storage on neutral lipids in broiler and quail. *J. Food Sci. Technol.* (India) 19(1); 1982; 7-10

Neutral lipid composition of the thigh and breast muscles and changes in neutral lipids of raw and cooked broiler and quail meat stored at 4 and -10 C were studied. Total glyceride content in the thigh muscle was significantly greater than in the breast muscle in the two species. Cooking and storage caused an increase in the total glyceride content in the thigh and breast muscles. A significant increase of mono- and diglycerides and a decrease of triglycerides occurred during cooking and storage. Changes in neutral lipid and its fractions were more at 4 than at -10 C of storage. AA

1716 DASPURAKAYASTHA (PC). Amino acid requirements for chicken. *Poult. Guid.* 18(7); 1981; 59-60

1717 VOIGT (MN), WYATT (RD), AYRES (JC) and KOEHLER (PE). Abnormal concentrations of B vitamins and amino acids in plasma, bile, and liver of chicks with aflatoxicosis. *Appl. Environ. Microbiol.* 40(5); 1980; 870-75

1718 PRABHAKARA REDDY (K) and VARADARAJULU (P). Influence of storage condition and package density on microbiological profiles of ready-to-cook poultry. *Indian Poult. Gaz.* 65(2); 1981; 48-52

56 broiler halves packaged in polythene bags (100,150, and 200 gauge) were either chilled (5 ± 1 C) or frozen (-10 ± 2 C). Total aerobic count, psychrophilic count, and yeast and mould counts on the carcass surface were estimated on fresh carcasses (o hour), after 48 hours and 96 hours of chilled storage, and after 15 and 30 days of frozen storage. Birds chilled for 48 hours and 96 hours and those frozen for 30 days had significantly higher microbial loads than fresh birds. Total aerobes and psychrophils were fewere ($P < 0.05$) in birds kept for 15 days under frozen storage than in the fresh birds. There were no significant difference ($P < 0.05$) in the microbial counts on carcass surface kept in the three types of packages. KMD

1719 SHRIVASTAV (AK). Mycotoxins in feeds and their prevention. *Poult. Guide.* 18(7); 1981; 73-5

1720 COX (NA), BAILEY (JS), THOMSON (JE) and CARSON (MD). Lactose preenrichment *versus* direct enrichment for recovering *Salmonella* from deep-chilled broilers and frozen meat products. *Poult. Sci.* 59(11); 1980; 2431-6

1721 CRAWLEY (SW), SLOAN (DR) and HALE (KK) Jr. Yields and composition of edible and inedible by-products of broilers processed at 6,7 and 8 weeks of age. *Poult. Sci.* 59(10); 1980; 2243-6

Percent yields and nutrient composition were determined on inedible by-products and giblets of broilers processed at 6,7 and 8 weeks of age. All inedible by-products and giblets were collected from 120 broilers (mixed sexes) for each age group and percent yield determined as a function of live weight. Wet yields of the various products were: blood, 3.1%; feathers, 21.3%; feet, 4.1%; heads, 3.0%; necks, 3.6%; gizzards, 3.0%; livers, 2.0%; hearts, 6%; and viscera, 8.0% for the 7-week-old birds. Some offal yield differences were noted among the three age groups. Moisture content of the offal averaged approximately 70% for most products. Exceptions were blood (Ca 84%) and gizzards, feet, and necks (Ca 60%) moisture. Approximate lipid composition was 17% for neck, gizzards, and hearts; 11% for feet and viscera; 8% for heads and livers; and 1.5% for blood and feathers. On a wet basis, protein content for hearts, blood, and viscera averaged approximately 12%; heads, necks, and gizzards, 15%; feet and livers, 20%; and feathers, 25%. AA

1722 LANE (RH), MUIR (WM) and MULLINS (SG). The influence of fryer temperature and raw weight on fry time of deep-fat fried chicken thighs. *Poult. Sci.* 59(11); 1980; 2467-9

Raw, breaded chicken thighs were fried at three different temperatures (163,177, and 191 C) to an internal end-point temperature of 93 C. Fry time decreased with increasing fryer temperature ($P < 0.001$). A regression equation was established for predicting fry time as a function of average raw thigh weight at each fryer temperature. In the range investigated neither number of pieces nor fryer load affected fry time at 163C ($P > 0.05$). AA

1723 MCBRIDE (GM), SKURA (BJ), YADA (RY) and BOWMER (EJ). Relationship between incidence of *Salmonella* contamination among pre-scalded, eviscerated and post-chilled chickens in a poultry processing plant. *J. Food Prot.* 43(7); 1980; 538-42

1724 MAHAPATRA (CM), SUSHIL KUMAR and PANDEY (NK). A decade of poultry products technology research at C.A.R.I. (erstwhile Poultry Research Division, IVRI). *Indian Poult. Gaz.* 65(3); 1981; 67-77

The various projects on processing of chicken and quail eggs, and chicken and quail meat and on various poultry byproducts, undertaken during the last ten years at the Central Avian Research Institute have been briefly reported. KMD

EGG

1725 CUNNINGHAM (FE) and YLANDER (DM). Ultrastructure of vitelline membranes from normal and mottled egg yolks. *Poult. Sci.* 59(11) 1980; 2449-55

This study showed that ultrastructure of the vitelline membrane degenerated with degree of yolk mottling. The more severe the mottling the greater the damage to the membrane. The vitelline membrane appears to be composed of three separate structures. The primary matrix (probably collagen) retains its composition until mottling is most severe; then this structure starts to come apart and lose its integrity. The secondary matrix (probably mucin) aids in holding the primary structure in a fixed position. When this structure is removed there is movement in the primary matrix causing large holes to appear. The tertiary matrix (also mucin) is the quickest to disintegrate. The tertiary matrix covers the other structures much like the cuticle around the egg shell. Once it is removed, the remaining structures are open to stress and damage as mottling increases. AA

SEAFOODS

FISH

1726 EASLEY (DM), KLEOPFER (RD) and CARASEA (AM). Gas chromatographic-mass spectrometric determination of volatile organic compounds in fish. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 653-6

1727 LOHS (P) and KAMPKE (G). Contribution to the problems of histamine formation in fishes and fish products with special regard to less known fish species. *Nahrung.* 24(3); 1980; 255-64 (Germna)

The authors demonstrate that histamine may be expected only if the fish meat contains free histidine. Fish species with darker meat are richer in histidine than fishes with white meat. Fish species from the Antarctica and from the Indian Ocean contain little histidine and no histamine. Of the Atlantic fish species, only the sardine proved to be a heavy histamine producer. Storage experiments with various fish species and fish products showed that the formation of histamine is likely to occur at temperatures of 20 to 22 C, but not at 10 C. However, even at temperatures of 20 to 22 C histidine

will not be decarboxylated to histamine in any case. It must be assumed that the bacterial flora is of decisive importance in the formation of histamine. Preliminary trials showed that the techniques currently used for the preparation of fish products in the industry (frying and steaming) are obviously not likely to bring about the increase in histamine content. Only subsequent contamination of the products with histamine forming bacteria is considered to be the cause of histamine formation. To keep down the risk of histamine formation in mackerel and sardine-like fishes, special precautions must be taken in the fish industry. AA

1728 REVANKAR (GD), KESHAVA (N), NAIDU (AK) and BALIGA (BL). Fish mince: preparation and composition. *Indian Food Packer.* 36(4); 1981; 20-24

Few varieties of miscellaneous fish ((i) Croacker (*Otolithus* sp.), (ii) Snake fish (Plety cephalus), (iii) Lizard fish (Saurida sp.), (iv) Pink perch (Nemipterus sp.), (v) Sole fish (Cynoglossus sp.)., (vi) Horse mackerel (Caranx), (vii) Shrimp (Stytifera), (viii) White bait (*Anchoviella Commersoni*), (ix) Silver belly (Leognathus sp.), (x) Cat fish, (xii) Ribbon fish (*Trichiarus laumella*) normally obtained as by catch in shrimp trawlers were studied for their physical ((a) dressed percent yield, (b) yield of minced meat) and chemical constituents ((c) moisture (d) protein (e) fat) and effect on storage behaviour as frozen blocks glazed in iced water after packing in polythelene bags and subsequently in waxed cartons. On storage at -19 C, (a) was 70-78% in (iii), (v) and (xii), with the average around 54% for others. (b) in (iv) was 27.3-43.3 as against 12.0-32.0% for (vi). Values for (c) ranged from 70.9-82.6%, while (d) was from 12.3-23.6%. However, (a) varied widely from 0.1-9.0%. Frozen blocks of minced meat had a good satisfactory shelf life of 3 months, whereas it was upto 9 months when prepared from first picked meat. Consumers preferred packs of 200 and 500 g. of frozen blocks than smaller ones. BSN

KRILL

1729 CHING-SAN CHEN and SHWU-WEN GAU. Polysaccharidase and glycosidase activities of Antarctic krill *Euphausia superba.* *J. Food Biochem.* 5(1); 1981; 63-8

TUNA

1730 LONBERG (E), MOVITZ (J) and SLORACH (S). Histamine in canned tuna. *Varfoda.* 32(3); 1980; 114-23 (Swedish)

The National Food Administration has analysed a total of 282 cans of 16 different tuna fish products. In 14% of the randomly chosen cans, the histamine content exceeded 100 mg/kg and in 7% it exceeded 200 mg/kg. High histamine levels were found more often in cans from Malaysia, Taiwan and Thailand than from the other countries studied. The results of this study will be used in establishing a maximum acceptable level for histamine in fish and when deciding whether or not to introduce import control for canned tuna. AA

SHELLFISH

1731 HUNT (DA), LUCAS (JP), McCLURE (FD), SPRINGER (J) and NEWELL (R). Comparison of modified A-1 method with standard EC test for recovery of fecal coliform bacteria for shellfish. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 607-10

1732 COOK (DW). Automatic incubator for use with modified A-I test for enumerating fecal coliform bacteria in shellfish growing waters. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 771-3

1733 HUSSONG (D), COLWELL (RR) and WEINER (RM). Rate of occurrence of false-positive results from total coliform most-probable-number analysis of shellfish and estuaries. *Appl. Environ. Microbiol.* 40(5); 1980; 981-3

The incidence of confirmed test, false-positive coliform most-probable-number results was compared with environmental parameters and was found to be inversely related to water temperature. It is concluded that the completed coliform test must be done when water temperatures drop below 15 C. AA

CRAB

1734 KRZYNOWEK (J) and WIGGIN (K). Generic identification of cooked and cfrozen crabmeat by thin layer polyacrylamide gel isoelectric focusing: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 670-73

SHRIMP

1735 CHAMBERS (TL) and STARVSZKIEWICZ (WF) Jr. High pressure liquid chromatographic method for indole in shrimp. Development of method and collaborative study. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 592-602

Recoveries from the HPLC method averaged 104% (range 90-127%) and 102% (range 93-112%) at indole levels of 25 and 35 µg% respectively. Repeatability, between-laboratory variability, and reproducibility were better at all indole levels by the HPLC method than by the AOAC-GLC method. The HPLC method has been adopted as official first action for indole levels in shrimp exceeding 1 µg/100g. VR

1736 CHAMBERS (TL) and STARVSZKIEWICZ (WF) Jr. Ultraviolet detection procedure for liquid chromatographic determination of indole in shrimp. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 603-6

In an ultraviolet detection procedure indole was extracted from shrimp by blending with carbonate buffer and then partitioned into ethylacetate. Concentrated column effluent was injected into the chromatograph (HPLC). Indole was detected by monitoring absorbance at 217 nm and quantitated by comparison of indole peak height to that of an internal standard 2 methylindole. Recoveries of indole ranged from 72 to 117%. The ultraviolet procedure could be useful for the detection of indole levels approaching 0.05 µg/100g shrimp if a fluorescence detector is used instead of an ultraviolet absorbance detector. VR

PROTEIN FOODS

1737 FAVRE (B). For better knowledge about vegetable proteins. Principles of manufacture and utilization. *Ind. Alim. Agric.* 97(6); 1980; 553-8 (French)

Various methods of producing vegetable protein have been discussed. Each vegetable protein has its own functional and nutritional characteristics which make it suitable for certain uses. A better knowledge of the relationship between the price and qualities of a product would make possible a more objective utilization of the product. KMD

1738 UZZAN (A). Proteinaceous substances of vegetable origin: General considerations. *Ind. Alim. Agric.* 97(6); 1980; 545-50 (French)

Vegetable proteins have several key advantages: economical, nutritional, technological, organoleptic or sensorial, and acceptability. Hence, they may be regarded as sure, safe, and stable products. Yet, their economic development has not been as rapid as expected. The hindrances - consumer reaction, legislation, labelling, reaction of professionals and mass media - have been brought to light. Efforts to improve the situation within the EUVEPRO federation have been outlined. KMD

1739 WOLZAK (A), ELIAS (LG) and BRESSANI (R). Protein quality of vegetable proteins as determined by traditional biological methods and rapid chemical assays. *J. Agric. Food Chem.* 29(5); 1981; 1063-8

Between PER and NPR in traditional biological assays for chemical estimate of protein quality of vegetable proteins. Significant correlation was observed in both the studies conducted, although a higher correlation was observed in the latter in which a smaller and homogenous group of samples was used. PER showed the best reproducibility. PER correlated better with chemical parameters than with NPR. C - PER values showed a highly significant correlation with PER for all the samples studied ($r = 0.871$; $n = 33$). However, it was found, that they overestimated protein quality of leguminous seeds and processed samples and underestimated that of mixtures added with animal protein. BSN

1740 JONES (GP), TUCKER (DJ) and WOODRUFF (I). Protein quality of a snack food. *J. Sci. Food Agric.* 32(2); 1981; 121-4

The effect of factory processing and commercial end-cooking on the protein quality of a popular snack food product made with meat, soya, vegetables and cereals (annual production = 10 000 tons) was investigated. No change could be detected in either the content of fluorodinitrobenzene-reactive lysine or the total levels of other amino acids as determined by ion-exchange chromatography. AA

FRUIT JUICES AND BEVERAGES

BLACK CURRANT JUICE

1741 SCHALLER (A), VOGL (K) and WEISZ (J). Results of studies regarding the influence of pasteurization on the acid catalysed hydrolysis of saccharose added to dilute black currant juice. *Confructa.* 25(3/4); 1980; 161-4 (German)

Results show that the acid-catalysed hydrolysis of saccharose during the pasteurization of diluted and sweetened black currant juice decreases the intensity of sweetness only under special conditions i.e. at a low pH value (of about 2.8) together with a relatively high heat load (of about 41 P_{80} units). VR

GRAPEJUICE

1742 WILLIAMS (PJ), STRAUSS (CR) and WILSON (B). Classification of the monoterpenoid composition of muscat grapes. *Am. J. Enol. Vitic.* 32(3); 1981; 230-35

When Muscat of Alexandria grape juice was stripped with pentane and then with Freon F 11, the residue comprises of only monoterpene precursor substances. The pentane extract has the free terpenes, whereas freon extracts contain polar polyhydroxylated monoterpenes (polyols), or free terpenes. The monoterpene residual precursors in the solvent stripped juice are derivated as water-soluble conjugated compounds. On hydrolysis, precursors yield highly reactive polyols, besides most of the already known volatile terpenoid aroma substances. BSN

ORANGE JUICE

1743 LAFUENTE (B), GASQUE (P), NIETO (P) and IZQUIERDO (L). A method for obtaining orange juice blends with preestablished colour. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 549-53 (Spanish)

A method to calculate adequate blend proportions of two orange juices to obtain products with the desired colour is described. By using Hunter colour values, an equation which relates a/b ratio of blends, and corresponding proportions of juices was obtained. With this equation, the amount of each juice to obtain a blend having a preestablished a/b value can be calculated. Validity of this method for high turbidity juices (L_{12}-$L_{36} < 4'5$), was confirmed by sensorial tests. AA

1744 ALBEROLA (J) and IZQUIERDO (L). The volatile fraction of orange juice. III. Total volatile analysis. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 469-82

Main isolation and concentration techniques of total organic volatile compounds of orange juice used to prepare aroma samples for gas chromatography are reviewed. Methods using distillation and extraction of distillates with organic solvents as well as direct extraction of juice with solvents are mainly studied. AA

1745 PEREZ (R), GASQUE (F), IZQUIERDO (LJ) and LAFUENTE (B). Aroma recovery and sulphur dioxide preservation of orange juice. *Confructa.* 25(3/4); 1980; 132-40 (German)

Sulphur dioxide has been traditionally used as an effective antiseptic in wine making as well as in fruit juice preservation. The disadvantage of sulphur dioxide as juice preservative is the loss of aroma components that take place during desulphitation. To overcome this difficulty a process was developed, basicaly consisting in the recovery of volatile fraction from freshly extracted juice before being sulphited and stored at room temperature. Final reconstitution of the juice is accomplished by stripping off the sulphur-dioxide and adding back the previously recovered aroma components stored at -18 C to the desulphited juice. It was found that the sulphur dioxide content could be reduced below its sensory threshold by subjecting the juices to three successive stages of flash evaporation. Acceptance of the reconstituted juices was not significantly affected by this treatment. VR

1746 KANNER (J), HAREL (S), FISHBEIN (Y) and SHALOM (P). Furfural accumulation in stored orange juice concentrates. *J. Agric. Food Chem.* 29(5); 1981; 948-49

The mode of furfural accumulation was determined in aseptically filled containers of single-strength orange juice and concentrates during storage at six different temperatures. Results showed that furfural accumulated in orange juice more rapidly than in concentrates of 34, 44, and 58°Brix. There was 4 times the amount of furfural in orange juice (12°Brix) than in concen-

trate (58°Brix) stored at 17 C for 100 days. A peak accumulation of furfural which was formed immediately after processing in high juice concentrates (58 °Brix) was eliminated by increasing deaeration. In concentrates evacuated to 40 mmHg, furfural concentration increased gradually during storage at a rate dependent on storage temperature and degree of juice concentration. AA

SWEET CHERRY

1747 ANCHEV (S), IONCHEVA (N), GENOV (N) and MALCHEV (E). Gas chromatographic identification of phenolic acids found in sweet cherry and sour cherry juice. *Nahrung.* 24(3); 1980; 251-3

In juice of 5 varieties of sour cherries and one variety of sweet cherries, the following compounds have been identified: salicyclic, cinnamic, gentisic, quinic, p. coumaric, gallic and isoferulic acids. Using the method of the internal standard the quantities of these acids were calculated. Except for 2 varieties in all the rest, salicyclic acid is present large amounts. Cinnamic and quinic acids are found in very small quantities. AA

TEA

1748 ANON. International standards for tea. *Planter's Chronicle.* 56(12); 1981; 524-5

Discusses: standards and prices: existing objective standards; chemical specifications of ISO 3720 for black tea; and countries which have approved ISO standard 3720. BSN

1749 PRABHA (TN), RAMAKRISHNA (M), PATWARDHAN (MV) and RAGHAVENDRA RAO (MR). Studies on immobilization of polyphenoloxidase from tea leaves and mango peel. *Indian J. Biochem. Biophys.* 18(6); 1981; 402-5

Polyphenoloxidases (EC 1.14.18-1) were isolated from mango peel and green tea leaves and immobilized by using various supports such as polyacrylamide gel, DEAE-sephadex, DEAE-cellulose, collagen, arylamine glass and alkylamine glass. Various properties of the immobilized enzymes like optimum temperature and pH, Km values, substrate specificity, thermal stability, storage stability and reusability were studied and compared with those of the native enzyme. Results showed that polyphenoloxidase preparations from mango peel and tea leaves exhibit different properties even in the native stage and that their behaviour and response after immobilization are also different. The higher specific activities, lower Km values, high reusability, good storage stability, wider pH and temperature optima of the immobilized enzyme might have advantages over the soluble during processing operations such as fermentation and manufacture of instant tea. It was concluded that tea leaf polyphenoloxidase entrapped in polyacrylamide gel and complexed with collagen, and mango peel polyphenoloxidase immobilized in DEAE-sephadex are quite satisfactory. MVG

COFFEE

1750 TRESSL (R) and SILWAR (R). Investigation of sulphur-containing components in roasted coffee. *J. Agric. Food Chem.* 29(5); 1981; 1078-82

By means of distillation-extraction, adsorption chromatography, and capillary gas chromatography - mass spectrometry, 23 sulphur components (mercaptans, sulphides, and di- and trisulphides) were characterized in roasted coffee. Fifteen components were identified for the first time and confirmed

by synthesis (among them are sulphur containing furans and two dithiolanes). The amounts of sulphur components were determined in roasted Arabica and Robusta coffees, as well as in instant coffee. AA

BEVERAGE

1751 DENNISON (DB), BRAWLEY (TG) and HUNTER (GLK). Rapid high performance liquid chromatographic determination of ascorbic acid and combined ascorbic acid - dehydroascorbic acid in beverages. *J. Agric. Food Chem.* 29(5); 1981; 927-9

The rapid HPLC technique- involves isocratic separation of ascorbic acid in 6 minutes on a μ Bondapak NH_2 column using 50:50 (v/v) methanol - 0.25% KH_2PO_4 buffer (pH 3.5) solvent and determination by first reduction of dehydroascorbic acid to ascorbic acid by treatment with DL-homocysteine. The reaction gets completed in 15 minutes and the total ascorbic acid analysis may be performed immediately. For selected beverages like orange juice, soft drink powdered drink and protein fortified drink, the method may be applied. BSN

1752 STRUNK (DH), HAMMAN (JW), AICKEN (JC) and ANDREASEN (AA). Density meter determination of proof of alcoholic beverages: Collaborative study. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 550-53

The procedure using the Mettler/Paar density meter to measure proof of alcoholic beverages is simple and accurate. Specific gravity is measured to ± 0.00001, which corresponds to an error less than ± 0.02° proof. The density meter values for these samples are 0.00 to 0.17° lower than true proof as determined by a pycnometer. VR

1753 BUSTOS (OE). Alcoholic beverage from chilean *Opuntia ficus indica*. *Am. J. Enol. Vitic.* 32(3); 1981; 228-9

Juice from small size prickly pears (tunas) (*Opuntia ficus indica*) grown in Chile was fermented with different levels of yeast, citric acid and SO_2 and the clarified juice was analysed for its different alcoholic and nonalcoholic components and fermentation rates. Juice from nontreated fruit gave a very strong vinegar by surface contamination. Wine and alcohol of good enological quality, as assessed by taste panel studies, were obtaind. BSN

WINE

1754 FATICHENTI (F), FARRIS (GA), DEIANA (P), CECCARELLI (S) and SERRA (M). Commercial trial of winemaking using two selected starters of *Saccharomyces cerevisiae* which do not reduce malic acid content. *Am. J. Enol. Vitic.* 32(3); 1981; 236-40

1755 WAGENER (GWW). The effect of different thermovinification systems on red wine quality. *Am. J. Enol. Vitic.* 32(3); 1981; 179-84

The quality of wines from juice from the different units of Gasquet thermovinification plants do not differ significantly, when made separately or in mixed form. Wines from the dejuicer, final press or a mixture of these two are astringent and intensely deep coloured and as such they cannot be marketed. BSN

1756 LEE (CY) and COOLEY (HJ). Higher alcohol contents in New York wines. *Am. J. Enol. Vitic.* 32(3); 1981; 244-6

Higher alcohol (n-propyl, isobutyl, active-amyl, and isoamyl alcohols) concentrations in various varieties of white and red table wines made from

New York State grapes were measured. Some varietal differences were observed. Seyval wine contained the highest amount of higher alcohol among white wines and Concord was the highest in reds. Red wines contained (average 339 mg/L) more higher alcohol than white wines (average 188 mg/L). AA

1757 BERNAL (JL), DEL NOZAL (J) and PARDO (R). Fluoride determination in wines. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 541-8 (Spanish)

A method for the fluoride determination in wines, using an ion-selective electrode has been carried out. The interfering action of ethanol is previously determined, and two analytical procedures consisting in a direct potentiometry and a standard addition method using a Gran's Plot, are tested. This last method showed better results and was applied to the fluoride determination of 57 wine samples from the province of Valladolid (Spain). A normal range of F (0.02-0.38 ppm) was observed, which indicates that fluorides were not added to the wines. AA

1758 OUGH (CS), DAUDT (CE) and CROWELL (EA). Identification of new volatile amines in grapes and wines. *J. Agric. Food Chem.* 29(5); 1981; 938-41

For the first time, a number of amines, which include methylamine, dimethylamine, ethylamine, n-propyl amine, isobutylamine, α-amylamine, isoamylamine, pyrrolidine and 2-phenethylamine have been identified. Separation of trifluoroacetamides (TFA) the amines was accomplished by use of carbowax 20 M or SE-54 fused silica capillary columns and identified by retention times and MS. Diethyl and α-amyl were identified for the first time in wine. Data on mass spectra of the pure TFA have been presented and discussed. BSN

1759 OUGH (CS) and DAUDT (CE). Quantitative determination of volatile amines in grapes and wines. I. Effect of fermentation and storage temperature on amine concentrations. *Am. J. Enol. Vitic.* 32(3); 1981; 185-8

A quantitative method for measuring several volatile amines (diethyl, dimethyl, ethyl, methyl, n-propyl, active amyl (a-amyl), isoamyl and 2-phenethyl) in grapes and wine is presented. Quantification in the low µg/L ranges was achieved. The changes in amine concentrations during fermentation temperature on the amine content were also reported. Median fermentation temperature ranges result in the lowest amine content. Evidence supports the assumption that the volatile amines are metabolized by the yeast during early stages of growth and that some are released at the conclusion of fermentation or may form by some other means during storage. AA

1760 MITCHELL (JD) and BENJAMIN (CR). Automated thermal conductivity determination of carbon dioxide in wine. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 547-9

Determination of CO_2 in Lambrusco, using an automatic analyzer, has proven to be both fast and precise. The analyzer uses a thermal conductivity detector to measure CO_2 gas liberated from the sample. Good accuracy was obtained when the method was compared to the enzymatic method. Ten samples gave an average difference of 1.4% from the accepted method. AA

1761 TYSON (PJ), LUIS (ES), ROY DAY (W), WALKER (B) and LEE (TH). Estimation of soluble protein in must and wine by high-performance liquid chromatography. *Am. J. Enol. Vitic.* 32(3); 1981; 241-3

Estimation of total soluble protein in must and wine by high-performance liquid chromatography is achieved with a size exclusion column. A protein standard, bovine serum albumin, is eluted from this column with linear response to a concentration of 1 g/L. Protein is separated from other UV

absorbing components of must and wine and estimated at 280 nm on a Waters Protein Separation System with a 0.1-M ammonium acetate mobile phase containing 10% glycerol. The method is now used routinely for estimation of protein in must and wine. AA

1762 HERRAIZ (M) and CABEZUDO (MD). Sensory profile of wines, quality index. *Process Biochem.* 16(1); 1980-81; 16-9,43

Discusses: flavour profile method; handling of taster's answers; and quality of Rioja wines estimated by sensory and GLC data. BSN

1763 McDONALD (J). The lead contamination problem with emphasis on the lead content of wine. *Am. J. Enol. Vitic.* 32(3); 1981; 219-22

Discusses: sources of lead exposure; biochemistry and metabolism of lead; symptoms and diagnosis of poisoning; monitoring of exposure; and lead content of wine. BSN

BEER

1764 JOE (FL) Jr., ROSEBORO (EL) and FAZIO (T). High pressure liquid chromatographic method for determination of polynuclear aromatic hydrocarbons in beer. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 641-6

1765 PEPPARD (TL) and HALSEY (SA). Amino acid esters in beer. *J. Inst. Brew.* 87(2); 1981; 85-6

The ethyl esters of valine, leucine and *iso*-leucine were present in experimental beers in the range of *Ca.* 3 ppb - 71 ppb. Beer flavour is significantly influenced by these compounds upto atleast 12 ppm. BSN

1766 SHARPE (FR) and LAWS (DRJ). The essential oil of hops. A review. *J. Inst. Brew.* 87(2); 1981; 96-107

Discusses: isolation and identification; composition; varietal differences; decomposition and loss of essential oil from hops; hop oil components in wort and beer; and methods of imparting hop character to beer. BSN

1767 HARPER (DR). Microbial contamination of draught beer in public houses. *Process Biochem.* 16(1); 1980-81; 2-7,21

BRANDY

1768 PUECH (JL) and ESTRELLA (MI). Lignine content in Spanish brandies. *Rev. Agroquim. Tecnol. Aliment.* 19(4); 1979; 554-7

The lignine content is determined through a measurement of the amount of methoxyl groups carried out by gas chromatography. We have applied this method to Spanish brandies, and have been able to estimate a lignine content from 31 to 447 mg/l. We have determined as well the content in ethoxyl groups; the values found range from 15 to 60 mg/l. AA

1769 PASPALEEV (E), KANTSCHEV (K), DENTSCHEVA (D) and BATZALOVA (K). Attempts to determine polarographically the diacetyl content in brandy distillates and wines. *Nahrung.* 24(3); 1980; 303-7 (German)

The direct polarographic determination of diacetyl, caproaldehyde, i-valeric aldehyde and acrolein in brandy distillates presents some difficulties due to the very low concentrations (of the order of 10^{-5} M). For this reason, it was attempted to concentrate these components by precipitation

with 2,4-dinitrophenylhydrazine in hydrochloric acid medium. The conditions required for the decomposition of the hydrazones by α-ketoglutaric acid, and for the distillation of the released substances, as well as the conditions needed for their polarographic analysis were established. The proposed method is suited for determining diacetyl in brandy distillate, and wine samples taken in the plant. AA

WHISKY

1770 STRUNK (DH), TIMMEL (BM), HAMMAN (JW) and ANDREASEN (AA). Determination of colour intensity of whisky and other alcoholic products. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 541-6

The colour intensity of aged alcoholic products and others coloured with caramel which have the spectral characteristics of these products can be measured effectively with a spectrophotometer or colorimeter with a bandwidth ≤ 10 nm at 525 nm in a 1 cm cell or tube with water as the reference sample. With this procedure the colour values of most alcoholic products are measured in the most sensitive portion (0 to 0.3 absorbance) of the instrument scales. VR

RUM

1771 GANOU-PARFAIT (B) and PARFAIT (A). Problems arising out of the utilization of *Schizosaccharomyces pombe* in manufacture of rums. *Ind. Alim. Agric.* 97(6); 1980; 575-80 (French)

Schizosaccharomyces pombe can be used instead of *Saccharomyces cerevisiae* for the production of rum. Some strains of *S. pombe* have been selected for microbiological and biochemical studies, to be conducted with cane juice as the medium. The rate of fermentation is usually quite low, but it can be accelerated by increasing the yeast concentration. *S. pombe* appears to be better than *Saccharomyces cerevisiae* in the formation of major volatile components. KMD

OILS AND FATS

1772 LAWRENCE (BM). Progress in essential oils. *Perfum. Flavor.* 6(2); 1981; 59-63

Discusses the R&D progress related to: cassia oil; fennel oil; genet absolute; laurel leaf oil; peppermint oil; roman chámomile oil; and wormwood oil. BSN

1773 KROLL (J), HASSANIEN (FR), GLAPINSKA (E) and FRANZKE (CL). Preparation and properties of the immobilized lipase from *Geotrichum candidum*. *Nahrung.* 24(3); 1980; 215-25 (German)

1774 AHUJA (KL) and BAJAJ (KL). Colorimetric determination of sterols in vegetable oils with chloramine T and sulphuric acid reagent. *J. Am. Oil. Chem. Soc.* 50(8); 1980; 250-51

A new colorimetric method for determination of sterols in vegetable oils using chloramine T and concentrated sulphuric acid reagent is described. After saponification of oils, the sterols present in the unsaponifiable matter are separated by thin layer chromatography (TLC) on Silica Gel G plates in

the solvent system ethyl ether/petroleum ether (40-60 C) (1:1). The sterols are treated with 1% chloramine T in concentrated H_2SO_4 at 100 C for 12 minites to develop the yellowish-brown colour which is read at 400 nm. Sterol content is calculated against a cholesterol standard. The method is at least 5 times more sensitive than that which uses Liebermann-Burchard reagent; colour formed is stable for 48 hours. AA

1775 ZAK (B). Cholesterol methodology for human studies. *Lipids.* 15(9); 1980; 698-704

Discusses: direct action method; partial purification by use of organic solvents; complete isolation of cholesterol; screening, reference and definitive procedures; interferences; standardization; equilibrium reactions; and reaction mechanisms. BSN

1776 KRAMER (JKG). Comparative studies on composition of cardiac phospholipids in rats fed different vegetable oils. *Lipids.* 15(9); 1980; 651-60

1777 LIE KEN JIE (MSF). Fatty acids XX. Location of the position of the furan ring in 2,5-disubstituted furan-containing fatty acids by GLC analysis of oxidation products. *J. Am. Oil Chem. Soc.* 50(8); 1980; 261-2

1778 THURSTON (PA), TAYLOR (R) and AHVENAINEN (J). Effects of linoleic acid supplements on the synthesis by yeast of lipids and acetate esters. *J. Inst. Brew.* 87(2); 1981; 92-5

SPICES AND CONDIMENTS

SAGE

1779 FREEMAN (CC). Brine saturation technique for extraction of light filth from rubbed and ground sage: intralaboratory study. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 773-4

PEPPER

1780 OLSEN (RA) and SPESSARD (GO). A short, steroselective synthesis of piperine and related pepper-derived alkaloids. *J. Agric. Food Chem.* 29(5); 1981; 942-4

Two-step stereoselective synthesis of (E,E)-1-(5-(1,3-benzodioxol-5-yl)-1-oxo-2, 4 -pentadienyl) piperidine (piperine; 2) and the related pepper alkaloids (E,E)-1-(5-(1,3-benzodioxol-5-yl)-1-oxo-2,4-pentadienyl) pyrollidine (trichostachine; 3) and (E,E)-5-(1,3-benzodioxol-5-yl)-N-(2-methylpropyl)-2,4-pentadienamide (piperlonguminine; 4) are described. The steps consist of first treating piperonal with the ylide derived from (E)-4-diethylphosphono-2-butenoate to give methyl (E,E)-5-(1,3-benzodioxol-5-yl)-2,4-pentadienoate (methyl piperate; 1b), followed by methoxide-catalyzed aminolysis 1b with piperine, pyrollidine, or (2-methylpropyl)amine. The second step proceeded in 75-86% yield. In contrast to the apparent previously noted limitations to the aminolysis reaction as a useful synthetic tool, the utility of this transformation in producing a variety of pepper-derived alkaloids is discussed. AA

PAPRIKA

1781 DRDAK (M), SORMAN (L), ZEMKOVA (M) and SCHALLER (A). Results of studies on the connection between composition of raw material and colour of ground seasoning paprika. *Confructa.* 25(3/4); 1980; 141-6 (German)

The results show that the colour of ground seasoning paprika is influenced significantly by the composition of raw material. But under the experimental conditions (kind of raw material and processing) the extent of the colour changes (hue, saturation and brightness) was small. A very close connection (100 R^2 = 88.4) exists between the brightness and the percentages of seeds, peduncles and green pericarp, which can be described by a first order polynomial. VR

CHILLI

1782 SAMBAIAH (K) and SATYANARAYANA (MN). Lipotrope like activity of red pepper. *J. Food Sci. Technol.* (India) 19(1); 1982; 30-31

When red pepper (*Capsicum frutescens*) at 5% or capsaicin at 15 mg% level was fed to rats along with chlorine - free diet, the increase in liver neutral lipids was significantly lower than in rats not fed red pepper or capsaicin. However, paprika (*Capsicum* annum) which contains very little capsaicin when fed at 5% level did not show this effect. KAR

ASAFOETIDA

1783 MANJUNATH (MH), SATTIGERI (VD), RAMA RAO (SN), NAGARAJA (KV) and KAPUR (OP). Asafoetida: Modified method for determination of alcoholic extract. *Indian Food Packer.* 35(4); 1981; 36-8

Alcoholic extract of asafoetida is commonly determined by U.S.P. 1936 method. The method has been found not suitable for the asafoetida samples which are in the semi-fluid (pasty) form and which gives low and erratic results at different periods of extraction. By the modified method developed, compounding asafoetida with previously dried soluble starch in 1:1 ratio and extraction with 90% alcohol in a soxhlet extractor for 6 hours gave consistant and reproducible results. AA

SENSORY EVALUATION

1784 GARDNER (RJ). A property-activity approach to relating 'flavour'; thresholds in one substrate to their value in a second substrate. *J. Sci. Food Agric.* 32(2); 1981; 146-52

1785 HERRMANN (J) and ABD EL SALAM (I). New methods for the evaluation and the analysis of organoleptic qualities of foodstuffs and for the forecast of their changes. Part 12. The quantitative analysis of diacetyl and vanillin and the determination of their distribution coefficient in water oil mixtures by means of the "subjective olfactometry". *Nahrung.* 24(3); 1980; 273-83 (German)

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

1786 VENUGOPAL (JS), PUTTE GOWDA and MAJUMDER (SK). Differential moisture absorption as an indicator of insecticidal quality in halloysites. *Res. Ind.* 26(4); 1981; 220-22

Activated clay could be used as grain protectant due to its lipophyllic nature. One way of determining the insecticidal potency is by bioassay which requires a maintenance of insect culture and long exposure period. A simple method based on differential moisture absorption and its relationship with the insecticidal property is discussed. AA

1787 CASTRO (CE) and BELSER (NO). Photohydrolysis of methyl bromide and chloropicrin. *J. Agric. Food Chem.* 29(5); 1981; 1005-8

The rate of hydrolysis of methyl bromide and chloropicrin can be markedly enhanced by light. An ~7-fold increase in the rate for methyl bromide results from irradiation with a small pen-ray UV lamp ($k_\lambda = 2.0 \times 10^{-6} s^{-1}$). At least 99.6% of the reaction proceeds quantitatively to methanol, bromide ion, and protons. A trace of methane (< 0.4%) is produced. The lack of any significant oxidation product of methanol or bromide ion along with the very small yield of methane is interpreted to indicate that the reaction is the result of the direct hydrolysis of photoexcited methyl bromide. Chloropicrin is decomposed even more rapidly by light ($k_\lambda = 1.4 \times 10^{-4} s^{-1}$). In neutral aqueous solution without irradiation, no hydrolysis is detected in 10 days. With irradiation, a 10^{-3} M solution is dissipated in hours. The products of the aqueous photo reaction in air are carbon dioxide, chloride ion, nitrate ion, and protons. Nitrite ion can be detected in small amounts (~2-3%) when the reaction is conducted under argon. The nitrite to nitrate conversion is not fast enough to accommodate the kinetics under aerobic conditions. AA

1788 KRISHNAMURTHY (TS), MAJUMDER (SK), MUTHU (M) and MURALIDHARAN (N). Unit for vacuum filling ethylene di-bromide in glass ampoules. *Indian Food Packer.* 35(4); 1981; 32-5

Ethylene-di-bromide (EDB) is employed as a spot fumigant and is finding increasing application for small scale fumigation of food grains. Its controlled release may be ensured by impregnating it in a carrier medium (ampoulding), which on exposure will slowly release the encapsulated EDB. The small scale ampoulding unit designed, consists of a thick-walled cylindrical 'corning' glass chamber with tapering bottom and which is closed by a glass lid with a bottle neck. Two bent tubes with gas cocks and vacuum gauge pass through the neck. A rotating stainless steel ring accommodates a three-tier-assembly, to hold glass ampoules of approximately the same dimensions, revolves within the sealed chamber about an axis with vacuum seal provided with neoprene rubber bearings. The EDB glass trough on stainless steel seating has the facility of moving up and down the chamber through a neoprene rubber seal and lever handle at the bottom of the chamber. Details of the operations of the unit have also been presented. BSN

1789 AGARWAL (RA). Pesticides and food production. *Pesticides.* 15(5); 1981; 3-4

Discusses briefly the impact of various programmes launched under the new agricultural strategy in the country and the role of insecticides on food production. BSN

1790 BHIRUD (KM) and CHAUHAN (YS). Crisis in pesticidal marketing. *Pesticides.* 15(2); 1981; 3-4

1791 CARSON (LJ). Modified storherr method for determination of organophosphorus pesticides in nonfatty food total diet composities. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 714-9

1792 HOPPER (ML). Gel permeation system for removal of fats during analysis of foods for residues of pesticides and herbicides. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 720-23

1793 AMBRUS (A), LANTOS (J), VISI (E), CSATLO'S (I), and SARVARI (L). General method for determination of pesticide residues in samples of plant origin, soil and water. I. Extraction and cleanup. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 733-42

1794 AMBRUS (A), HARGITAI (E), KAROLY (G), FULOP (A) and LANTOS (J). General method for determination of pesticide residues in samples of plant origin, soil, and water: II. Thin layer chromatographic determination. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 743-8

1795 AMBRUS (A), VISI (E), ZAKAR (F), HARGITAI (E), SZABO (L), and PAPA (A). General method for determination of pesticide residues in samples of plant origin, soil, and water. III. Gas chromatographic analysis and confirmation. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 749-68

1796 SKELLY (NE), JACKSON (DJ) and ANDERSON (PK). High pressure liquid chromatographic analysis of chlorpyrifos containing insecticidal formulations. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 628-34

1797 MORGAN (DP), LIN (LI) and SAIKALY (HH). Morbidity and mortality in workers occupationally exposed to pesticides. *Arch. Environ. Contam. Toxicol.* 9(3); 1980; 349-82

BIOCHEMISTRY AND NUTRITION

1798 BERGNER (H), BERGNER (U) and ADAM (K). Methodological studies as the use of ^{14}C-leucine and ^{15}N-leucine for following the absorption of amino acids in the experimental rat. *Nahrung.* 24(3); 1980; 227-38 (German)

1799 SOLIMAN (A-G M). Comparison of manual and benzenesulphonyl chloride semiautomated thiochrome methods for determination of thiamine in foods. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 616-22

1800 STARVSZKIEWICZ (WF) Jr. and BOND (JF). Gas chromatographic determination of cadaverine, putrescine and histamine in foods. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 584-91

Pentafluoropropyionyl (PFP) derivatives of the diamines, cadaverine

and putrescine were chosen as the basis of a new quantitative procedure developed for the determination of the diamines. The procedure is rapid and has been used successfully on a variety of fishery and cheese products. Histamine did not chromatograph easily by this GLC method. However, the PFP derivative of histamine could be chromatographed. The retention times were 4.3, 5.7 and 7.0 minutes for the derivatives for putrescine, cadaverine and the internal standard respectively. Less than 1 µg diamine/g tissue could be quantitated, using either an electron capture detector or a nitrogen specific detector. VR

1801 MAGA (JA). Pyridines in foods. *J. Agric. Food Chem.* 29(5); 1981; 895-7
Discusses: food occurrences; flavour properties; and model system studies. BSN

1802 GREGORY (JF) III, MANLEY (DB) and KIRK (JR). Determination of vitamin B-6 in animal tissues by reverse-phase high-performance liquid chromatography. *J. Agric. Food Chem.* 29(5); 1981; 921-7
A reverse-phase high-performance liquid chromatographic (LC) method is described for the fluorometric determination of pyridoxal (PL), pyridoxamine (PM), and their 5'-phosphates (PLP and PMP) in a variety of animal tissues and milk. Samples are extracted with perchloric acid. Aliquats of neutralized extracts are treated with glyoxylic acid to deaminate PM and PMP, followed by derivatization with semicarbazide. LC analysis of the extracts prepared with and without glyoxylate treatment permits the individual quantitation of the B-6 vitamers. Fluorescence spectral analysis of collected LC fractions and correlation with microbiological assay results support the accuracy of the procedure. AA

1803 HASSAN (SSM). Manual and semiautomated spectrophotometric determination of vitamin K_3 by reactions with piperidine and malononitrile. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 611-5

1804 CILLARD (J), CILLARD (P), CORMIER (M) and GIRRE (L). α-tocopherol prooxidant effect in aqueous media. Increased autoxidation rate of linoleic acid. *J. Am. Oil Chem. Soc.* 50(8); 1980; 252-5

1805 CILLARD (J), CILLARD (P) and CORMIER (M). Effect of experimental factors on the prooxidant behaviour of α-tocopherol. *J. Am. Oil Chem. Soc.* 50(8); 1980; 255-61

1806 SHIRLOW (M) and MATHERS (C). Computer analysis of nutritional factors in the diet. *Food Nutr. Notes Rev.* 37(4); 1980; 157-60

1807 LEELARTHAEPIN (B), WOODHILL (JM) and BERNSTEIN (L). Computer application in dietary analysis from food intake information. *Food Nutr. Notes Rev.* 37(4); 1980; 161-5

1808 SMART (GA), WARRINGTON (M) and EVANS (WH). The contribution of lead in water to dietary lead intakes. *J. Sci. Food Agric.* 32(2); 1981; 129-33

1809 GUSSOW (JD). Nutrition education in a world of limits. *Food Nutr. Notes. Rev.* 37(4); 1980; 141-5

1810 POULIS (P). Mother's choice of method of infant feeding and serum cholesterol and triglyceride concentrations in early infancy. *Food Nutr. Notes Rev.* 37(4); 1980; 152-6

TOXICOLOGY AND HYGIENE

1811 YOSHIZAWA (T), SWANSON (SP) and MIROCHA (CJ). *In vitro* metabolism of T-2 toxin in rats. *Appl. Environ. Microbiol.* 40(5); 1980; 901-6

1812 LEE (S) and CHU (FS). Radioimmunoassay of T-2 toxin in biological fluids. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 684-8

1813 LAU (HP), FAN (SL) and CHU (FS). Preparation and characterization of aflatoxin Q_1-hemisuccinate. *J. Assoc. Off. Anal. Chem.* 64(3); 1981; 681-3

A method for the preparation and purification of aflatoxin Q_1-hemisuccinate is described. The overall yield after final purification was about 80-85% of the starting aflatoxin Q_1. The new aflatoxin derivative was characterized by thin layer chromatographic, high performance liquid chromatographic, ultraviolet, mass spectroscopic, and nuclear magnetic resonance spectral analysis. AA

1814 RICHMOND (ML), GRAY (JI) and STINE (CM). The rubratoxins: Causative agents in food/feedborne disease. *J. Food Prot.* 43(7); 1980; 579-86

Discusses: Rubratoxin occurrence; animal and microbial toxicity; morphology; isolation, identification and analysis; physical and chemical properties; new analytical methodologies; biosynthesis and toxin synthesis under controlled conditions. AA

1815 HERSCHDOERFER (SM). Food hygiene in the food industry. *Indian Food Packer.* 35(4); 1981; 47-57

Aspects covered include, planning and design, equipment, personnel, cleaning agents, detergents, cleaning procedures and other problems, BSN

1816 BOTTA (G). Hygiene and resinous coating for floors in the food industry. *Ind. Aliment.* 19(175); 1980; 668-70 (Italian)

1817 KOBURGER (JA). Stack-pouring of petri plates: A potential source of error. *J. Food Prot.* 43(7); 1980; 561-2

1818 ANDREWS (RE) Jr., IANDOLO (JJ), CAMPBELL (BS), DAVIDSON (LI) and BULLA (LA) Jr. Rocket immunoelectrophoresis of the entomocidal parasporal crystal of *Bacillus thuringiensis* subsp. *kurstaki*. *Appl. Environ. Microbiol.* 40(5); 1980; 897-900

1819 MERRILL (EP). Acceptability of individual water supplied as judged by a single test for total coliform bacteria. *J. Food Prot.* 43(7); 1980; 563

Of 658 individiual water supplies tested over an 8-year period, 69% of drilled wells, 62% of driven wells, 27% of dug wells and 32% of springs were judged acceptable on the basis of a single test for total coliforms. The acceptability standard consisted of 0 to 1 coliforms/100 ml of sample by the membrane filter method or a Most Probable Number index of less than 2.2 (presumptive and confirmed tests). AA

1820 RESTAINO (L), JETER (WS) and HILL (WM). Thermal injury of *Yersinia enterocolitica*. *Appl. Environ. Microbiol.* 40(5); 1980; 939-49

PUBLICATIONS OF

CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE, MYSORE – 570 013

National Information Centre for Food Science (NICFOS)

1.	Directory of Indian Processed Foods and Allied Industries.		Rs. 50.00
2.	Home Scale Processing & Preservation of Fruits & Vegetables.	English Edition	4.50
		Hindi Edition	1.00
3.	Balanced Diets and Nutritive Value of Some Common Recipes.	English Edition	5.50
		Kannada Edition	3·75
4.	Symposium on Proteins, 1962.		15.00
5.	Proceedings of the International Symposium on Protein Foods and Concentrates.		25.00
6.	Mango—An Industrial Profile, 1978.		8.00
7.	Food and Industrial Enzymes in India—A 1977 Profile		250.00

List of Bibliographies

1.	Select List of Books on Food Science and Technology in CFTRI Library, 1970		(out of stock)
2.	Refrigerated, Frozen, Cold Stored Fish, 1970.		-do-
3.	Egg and Egg Products, 1966–70, 1971.		-do-
4.	Pollution, 1965–70, 1971,		-do-
5.	Indian Information on Food Technology, 1966–69, 1971.		-do-
6.	Reference Materials Available in CFTRI Library, 1971.		-do-
7.	Parboiling of Paddy, 1972.,		-do-
8.	Alcoholic Beverages, 1965–71, 1972.		-do-
9.	Indian Institutions in the Field of Food Technology and Related Science, 1972.		-do-
10.	List of CFTRI Publications, 1950–70, 1972.		-do-
11.	Spices, 1966–72, 1974.		-do-
12.	Applied Nutrition and Dietetics in India, 1962–72, 1974.		-do-
13.	Refrigeration and Its Application for the Storage of Fruits and Vegetables, 1969–73, 1974.		-do-
14.	Fish Technology, 1969–73, 1974.		-do-
15.	Development of Fish Technology in India, 1964–73, 1975.		-do-
16.	Catalogue of Periodicals in CFTRI Library, 1975.		-do-
17.	Poultry Technology—World Over, 1970–75, 1976.		-do-
18.	Poultry Technology in India, 1966–75, 1976.		-do-
19.	Sorghum, Maize and Millets in India, 1960–70, 1976.	Available	Rs. 50.00
20.	Sorghum, Maize and Millets—World Over, 1970–75, 1976.	-do-	60.00
21.	Storage of Food Grains in India, 1945–72, 1978	-do-	50.00
22.	Technology Transfer, 1978.	-do-	25.00
23.	Indian Food Patents, 1978.	-do-	50.00
24.	Confectionery, 1974–78. 1979.	-do-	20.00
25.	Directory of On going Projects in Food Science & Technology and Related Areas in India	-do-	50.00
26.	By Products from Food Industries : Utilisation and Disposal : A Select Bibliography		50.00
27.	Pepper and Pepper Products : An Annotated Bibliography 1970-80.		50.00

Periodicals

1.	Food Technology Abstracts—Monthly—Annual Subscription		Rs. 45.00
2.	Food Digest (Quarterly) —	-do-	30.00
3.	Food Patents (-do-) —	-do-	15.00
4.	Ahara Vignana—Kannada (Bi-monthly Popular Magazine)	-do-	2.00
5.	Khadya Vijnan—Hindi (Quarterly Popular Magazine)	-do-	1.00

GENERAL

2119 TAIGANIDES (EP). Biogas - energy recovery from animal wastes. Part I and II. *World Anim. Rev.* No. 35; 1980; 2-12

After dispelling a few myths connected with biogas the author explains (a) the principles governing the anaerobic process involved in biogas production; and (b) the design, operation, and monitoring of the digester plant. Actual digester systems that have been operating in India, China, Federal Republic of Germany, and U.S.A., for the last ten years have been described and the economic aspects of biogas plant operations have been reviewed. KMD

2120 ANON. Breakthrough in solar energy. *East. Econ.* 77(8); 1981; 363

2121 FARKYE (NY). Urbanization and its impact on food and nutrition in Ghana. *Food News* 2(1); 1980; 2-4

2122 OSEI-MANU (P). Appropriate food technologies for Ghana in the 1980s. (1) and (2). *Food News* 2(1); 1980; 4-8

2123 GAVOR (ME). How the small-scale rural food processor in Ghana can be helped in the 1980s. *Food News.* 2(1); 1980; 8-9

2124 BUSHNELL (AC). New legislation and official literature issued during 1980. *J Assoc. Public. Anal.* 19(Pt. 1); 1981; 1-19

2125 HANOLD (T), PYNE (A) and McCULLOUGH (R). What can food processors do to defend against regulation and ensure success in the '80s? *Process. Prep. Food.* 149(7); 1980; 25-6, 28-30, 32, 34

2126 KRISHNA (G), YADAV (KR), PALIWAL (VK) and KHIRWAR (SS). Trace elements in agro-industrial byproducts and wastes of Haryana State. *Indian J. Dairy Sci.* 34(3); 1981; 336-8

2127 RELE (SJ). Marketing by small-scale sector. *East. Econ.* 77(8); 1981; 381-2

FOOD PROCESSING AND PACKAGING

2128 BOSWELL (B). Dehydration-convenience on a plate? *Food Flavour. Ingred. Packag. Process.* 3(4); 1981; 13. 15

2129 LOEFFEN (MPF), EARLE (RL) and CLELAND (AC). Two simple methods for predicting food freezing times with time-variable boundary conditions. *J Food Sci.* 46(4); 1981; 1032-4

Two simple methods for predicting the freezing times of rectangular bricks, slabs, cylinders, and spheres in situations where boundary conditions change with time are proposed. These methods are based on numerical integration of a simple differential equation derived from a previously proposed modification to Plank's equation. The methods were tested against a three time-level finite difference scheme for varying cooling medium

temperatures and surface heat transfer coefficients. Agreement was generally good (difference < 10%) between the two methods and the corresponding finite difference solution. AA

2130 COATES (CF) and RIDDELL (W). Assessment of thermal hazards in batch processing. *Chem. Ind.* No.3; 1981; 84-8

2131 ANON. Sterilisation advance by Jupiter! *Food Manuf.* 56(3); 1981; 65

PACKAGING

2132 KETTLEBOROUGH (AJ). Water-based laminating adhesives can be better than solvent types. *Paper Board Packaging* 65(10); 1980; 150-56

Recent developments indicate improved performance and elimination of solvent problems with new technology. KAR

2133 GOWRAMMA (RV), MAHADEVIAH (M), NARESH (R) and ANANDASWAMY (B). Determination of tin coating weight in differential tinplate by Clarke's test. *J. Food Sci. Technol.* (India) 19(2); 1982; 83-4

Clarke's test has been slightly modified to determine the thickness of tin coating in differential tinplate. Tin coating weight on both the sides can be determined separately by this method. KAR

2134 WOLF (JC), THOMPSON (DR), WARTHESEN (JJ) and REINECCIUS (GA). Relative importance of food composition in free lysine and methionine losses during elevated temperature processing. *J. Food Sci.* 46(4); 1981; 1074-8

Food systems composed of varying quantities of protein, sugar, oil, salt, cellulose, and water, and processed isothermally for varying time intervals at 65 or 115 C, were monitored for free lysine and methionine loss as a function of food composition (independent variables). The amino acid losses were best modeled by first order reaction kinetics with protein, sugar and water activity (a_w) having predominant influence over the rate of losses. With increased levels of protein and sugar, the rate coefficient increased; but it decreased when a_w was increased. Salt and oil had only minor influence by interactions among food components. MVG

2135 GILBERT (J) and SHEPHERD (KJ). Headspace gas chromatography for the analysis of vinyl chloride and other monomers in plastic packaging and in foods. *J. Assoc. Public Anal.* 19(Pt.2); 1981; 39-49

Discusses: types of plastics for food packaging; headspace GC for monomer analysis; difficulties and sources of error in monomer analysis; choice of GC detector for monomer analysis; and typical monomer levels in retail packaging and foods. BSN

2136 KUMAR (KR) and ANANDASWAMY (B). Storage behaviour of a low cost food supplement in flexible consumer packages. *J. Food Sci. Technol.* (India) 19(2); 1982; 81-3

Moisture sorption and storage studies were carried out on a food blend based on corn, sugar and fat. The product had initial and critical moisture contents (dry weight) of 5.4% and 8.2% respectively. The food blend packed (500 g) in low and high density polyethylene pouches (LDPE, HDPE) were stored for 4½ months and analysed for moisture, free fatty acids and peroxide values. The product had a shelf life of 1½ months at 38 C and 90% RH, whereas at 27 C and 65% RH, the shelf-life was 4½ months in LDPE

pouches. Shelf-life was longer (4½ months) in HDPE pouches under both the conditions of storage. AA

FOOD ENGINEERING AND EQUIPMENT

2137 ANGEL (D). Automated handling becomes a reality. *Food Flavour. Ingred. Packag. Process.* 3(7); 1981; 30-31

2138 TRINNAMAN (J). The wind of change in high production handling. *Food Flavour. Ingred Packag. Process.* 3(7); 1981; 16-7

2139 RUPP (WE). New pump uses old principles to move food products and wastes. *Food Eng. Int.* 6(3); 1981; 45-7

2140 STEPHENSON (RM) and ANDERSON (TF). Energy conservation in distillation. *Chem. Eng. Progr.* 76(8); 1980; 68-71

2141 ZIMMER (A). Developments in energy efficient evaporation. *Chem. Eng. Progr.* 76(8); 1980; 50-56

2142 KLAREN (DG) and HALBERG (N). Development of a multistage flash/fluidized bed evaporator. *Chem. Eng. Progr.* 76(7); 1980; 41-3

2143 YAWGER (ES), ADAMS (HW) and HARDT (PK). Water conservation in closed rotary cookers by evaporative cooling. *J. Food Sci.* 46(4); 1981; 1286-7

Better cooling and water savings of up to 40% may be realized by installing a blower in closed rotary coolers. The air blown through the cooler headspace aids cooling by causing water to evaporate from the can's surface. In four tests at a tomato plant in California, water flow rates with the blower off ranged from 25-29 gpm and with the blower on ranged from 12.5-18 gpm. The blower decreased the maximum temperature in the shell from 2-6 F and decreased the final average can temperature from 3.5-7 F. AA

2144 HAMPSON (GR). Energy conservation opportunities in cold storage warehouses. *Ashrae J.* 23(12); 1981; 19-20

2145 WEBBER (JF). Preventing flour heavage in refrigerated warehouses. *Ashrae J.* 23(12); 1981; 24-6

2146 FREEDMAN (GM). Strategy/criteria for transition of a central system from heat recovery to conventional heating and refrigerating. *Ashrae J.* 23(12); 1981; 27-30

2147 RAMANI (K). Electrochemical instrumentation: pH measurement. *Instrumentation Bull.* 2(4); 1981; 7-13

2148 JOSEPH (RL). Cold temperature or cold shortening. A turning point? *Farm Food Res.* 11(6); 1980; 169-70

2149 HORAK (J). Possibilities of rationalization in bottling plants. *Lebensmittelindustrie* 27(5); 1980; 210-14 (German)

Deals with rationalization of storage of empty kegs during the winter and the handling of kegs during washing, filling and dispatching in breweries

The principle of increase of the output of a bottle filling plant with minimum building capacity required is explained. AA

FOOD CHEMISTRY AND ANALYSIS

2150 SMITH (TA). Amines in food. *Food Chem* 6(3); 1981; 169-200

The role of aromatic amines is emphasised, as these may be toxic. Those considered are tyrosine, involved in the so-called 'cheese reaction', which may cause headache, brain haemorrhage or heart failure; those caused by bacterial action in cheese, milk, yeast extract, alcoholic drinks, meat products, sauerkraut, and fish; those from various plants and plant products including citrus fruits, apples, beer, coffee, wheat, chocolate (with a discussion on migraine) and tea. AA

2151 KJAER (A). Glucosinolates and related compounds. *Food Chem.* 6(3); 1981; 223-34

The characteristic flavour of cruciferous foods and the spicy character of some other plants are connected, though not necessarily synonymous, with their glucosinolates content. The understanding of the biological role of the glucosinolates has only just begun. In this paper, their occurrence, biosynthesis, catabolism and biological significance are discussed in detail. AA

2152 WALTER (RH) and SHERMAN (RM). Apparent activation energy of viscous flow in pectin jellies. *J. Food Sci.* 46(4); 1981; 1223-5

2153 CHANDEL (RS) and RASTOGI (RP). Triterpenoid saponins and sapogenins: 1973-1978. *Phytochemistry.* 19(9); 1980; 1889-908

2154 ISMAIL (F), VAISEY-GENSER (M) and FYFE (B). Bitterness and astringency of sinapine and its components. *J Food Sci.* 46(4); 1981; 1241-4

2155 WILLIAMS (JG) and BERNHARD (RA). Amino acid-lactose interactions and their sensory consequences. *J Food Sci.* 46(4); 1981; 1245-51, 1259

2156 ISHIBASHI (T) and KAWABATA (T). Formation of N-nitrosoproline by reacting nitrite with L-citrulline and L-arginine. *J. Agric. Food Chem.* 29(5); 1981; 1098-9

2157 TOWNSHEND (A). Uses of enzymes in analytical chemistry. *J Assoc. Public Anal.* 19(Pt.2); 1981; 51-8

Discusses: Michaelis - Menten equation; analytical application; monitoring substrate concentrations; enzyme cycling; monitoring enzyme concentrations; inhibitors and activators; applications in sample decomposition; insolublised enzymes; and enzyme electrodes. BSN

2158 GUZMAN CHOZAS (M), CAMEAN FERNANDEZ (AM) and FERNANDEZ DIEZ (MJ). Estimation of copper in the pulp of table olives. *An. Bromatol.* 32(1); 1980; 17-21 (Spanish)

A spectrophotometric method, of appropriate accuracy and sensitivity. has been evolved for the routine estimation of copper in an industrial laboratory. The method is based on the formation of a complex of Cu and EDTA. KMD

FOOD MICROBIOLOGY

2159 KIKUCHI (M). Application of genetics for strain improvement in industrial microorganisms. *Biotechnol. Bioeng.* 22(Suppl.1); 1980; 195-208

2160 LUTHER (H). Characterization of the mechanical disintegration of microorganism cells with the aid of conductivity measurement. *Nahrung.* 24(3); 1980; 265-72 (German)

As a rule, the isolation of constituents of microorganism cells require the disintegration of the cell walls, for which mechanical disintegration techniques have been found suitable. The most important parameter of these techniques is the degree of disintegration. Upto now, its determination required elaborate chemical, physico-chemical or microscopic procedures. This determination may be made much easier by taking advantage of the physico-chemical behaviour of the electrolytes contained in the cytoplasm. The electrolytes released together with the cytoplasm from the disintegrated cells increase the conductivity of the disintegrating suspension. A plot of the conductivity of the suspension against the degree of disintegration of the cells yields a linear relationship. AA

2161 NIVEN (CF) JR., JEFFREY (MB) and CORLETT (DA) JR. Differential plating medium for quantitative detection of histamine-producing bacteria. *Appl. Environ. Microbiol.* 41(1); 1981; 321-2

2162 SPICHER (G) and SCHRODER (R). The microflora of sourdough. IX. Communication: Comparative investigations over the performance of lactic acid bacteria (Genus *Lactobacillus Beijerinck*) occurring in starter cultures ("Reinzuchtsauer). *Z Lebensmittel-Unter. Forsch.* 170(4); 1980; 262-6 (German)

2163 ELANDER (RP). New genetic approaches to industrially important fungi. *Biotechnol. Bioeng.* 22(Suppl.1); 1980; 49-61

2164 LEWIS (NF) and SINKAR (VP). Optimization of nutrients and cultivation conditions in glucoamylase production. *J. Food Biochem.* 5(1); 1981; 69-77

Initial adjustment of pH of growth medium in the range of 3.0-5.0 was found to be necessary for optimal production of glucoamylase by a newly isolated strain of *Aspergillus niger*. Optimum temperature of incubation under stationary conditions was found to be 26-28 C, although incubation at higher temperatures viz. 30 and 37 C led to faster fungal growth rate and increased biomass. In complex medium, the optimum glucose and peptone concentrations were 2 and 3% respectively, and the presence of trace elements was found to be essential for maximal enzyme yield. AA

2165 JOHNSON (MJ). Research in fermentation biochemistry at the University of Wisconsin. *Biotechnol. Bioeng.* 22(Suppl.1); 1980; 209-13

TRUFFLE

2166 NEY (KH) and FREYTAG (WG). Truffle aroma. *Gordian.* 80(9); 1980; 214 (German)

The flavour of fresh French winter truffles (*Tuber brumale* var. *melanosporum*) was investigated. 8 alcohols were identified: ethanol, propanol,

isobutanol, isopentanol, 3-octanol, 1,octen-3-ol, 2-nonanol, 2-phenylethanol. Further, the authors found dimethylsulphide, isoamylamine, p and/or m-cresol. AA

MUSHROOM

2167 RAI (SC) and BHATIA (VK). Economics of mushroom cultivation. *East Econ.* 77(8); 1981; 383-5

2168 GHOSH (AK) and SENGUPTA (S). Influence of some growth factors on the production of mushroom mycelium in submerged culture. *J. Food Sci. Technol.* (India) 19(2); 1982; 57-60

The effect of vitamins, hormones and fatty acids on the submerged mycelial yields of 7 mushroom strains grown in synthetic media were investigated. None of the water soluble and fat soluble vitamins showed any significant growth-promoting effect for these mushrooms. Among the plant-growth hormones tested, kinetin is growth stimulatory for *T. clypeatus*, and *C. lagopus* while indole-3-acetic acid is for *V. volvacea*, but gibberellic acid has no such activity. Caprylic, capric, palmitic and stearic acids present in the medium affect growth. Caprylic and capric acids acted as growth inhibitors at high concentration, but stimulated growth of *T. clypeatus*, *C. lagopus* and *V. volvacea* at low concentration. AA

2169 HAMMOND (JBW). The composition of fresh and stored oyster mushrooms (*Pleurotus ostreatus*). *Phytochemistry* 19(12); 1980; 2565-8

Soluble carbohydrate, protein, polysaccharide and cell wall composition were assayed in freshly harvested *Pleurotus ostreatus* sporophores and those stored for 4 days at 2 or 18 C. Mannitol and trehalose were present at 1.8 and 6.5% dry weight respectively in fresh sporophores, and at reduced levels in those stored at 18 C. In sporophores stored at 2 C trehalose levels increased by upto 122%. Soluble polysaccharide appeared to be composed of glycogen-like material, which was susceptible to post-harvest breakdown, and components containing mannose and other sugars. The total protein content was 42% dry weight: no protein degradation was seen in sporophores stored at 2 C but about 25% of the protein disappeared during storage at 18 C. Cell wall polysaccharide was utilised during storage. Respiration rate was about 8-10 ml CO_2/g dry weight/hour at harvest and declined to about 5 ml/g dry weight/hour after 40 hours storage at 18 C. AA

FOOD ADDITIVES

2170 VALDEHITA (MT), CARBALLIDO (A), CARDOBA RODRIGUEZ (MA). Preservatives in foods : II. Densitometric method for determination of preservatives by TLC. *An. Bromatol.* 32(1); 1980; 93-106 (Spanish)

A method has been described which permits the simultaneous separation, identification, and estimation, by thin-layer chromatography and ultraviolet spectrophotometry in reflected light, of benzoic, sorbic, and O-Cl-benzoic acids, and the methyl, propyl, and butyl esters of p-hydroxybenzoic acid. The removal of the preservatives from food has been described in Part I. KMD

2171 HIROSE (M), SHIBATA (M), HAGIWARA (A), IMAIDA (K) and ITO (N). Chronic toxicity of butylated hydroxytoluene in Wistar rats. *Food Cosmet. Toxicol.* 19(2); 1981; 147-51

Groups of 57 Wistar rats of each sex were maintained on diet containing 0-25 or 1% butylated hydroxytoluene (BHT) for 104 weeks; control groups comprised 36 rats of each sex. Treated rats of both sexes showed reduced body-weight gain, relative spleen weight and white-blood-cell count while in the males there was also a reduction in serum triglyceride. BHT-treated animals of both sexes showed increased relative liver weight and total blood cholesterol, but increases in red-blood-cell count could be seen only in females and only the males showed increased γ-glutamyltransferase. No significant histological changes were observed in the liver or haematopoietic system to explain these haematological and biochemical changes. Tumours were found in the liver, pancreas, mammary glands, uterus, pituitary gland, adrenal glands and in some other organs of some of the treated rats, but their incidence was not significantly different from that in controls. This experiment showed no carcinogenic effect of BHT on rats. AA

2172 VORHEES (CV), BUTCHER (RE), BRUNNER (RL) and SOBOTKA (TJ). Developmental neurobehavioural toxicity of butylated hydroxytoluene in rats. *Food Cosmet. Toxicol.* 19(2); 1981; 153-62

The behavioural data expand the picture of BHT's toxicity, but do not suggest any disproportionate or special toxicity of BHT for the central nervous system. AA

2173 AHMAD (S) and BRANEN (AL). Inhibition of mold growth by butylated hydroxyanisole. *J. Food Sci.* 46(4); 1981; 1059-63

Growth of some species of *Penicillium*, *Aspergillus* or *Geotrichum* were inhibited in a glucose salts broth (GSB) by direct addition of 200 ppm of butylated hydroxyanisole (BHA); in potato dextrose agar (PDA), it inhibited *A. flavus* and *P. expansum* However, in processed cheese spread, 400 ppm was required to inhibit the growth of *A. flavus* or *P. expansum*, while 150-200 ppm concentration was sufficient to inhibit *A. flavus* by a BHA emulsion sprayed on the surface. In GSB, BHA (200 ppm) was effective over a wide range of pH and incubation temperatures against *A. flavus*. Autoclaving or extended, incubation slightly reduced antimicrobial activity against *A. flavus*. Antimicrobial activity against *A. flavus* was also depressed by lipid in GSB or PDA. BHA (150 ppm) plus potassium sorbate (0.2%) resulted in total inhibition of growth of *A. flavus* in GSB. MVG

2174 LOHMANN (R). Xanthenes - properties and possibilities of use in foodstuffs. *Gordian.* 80(9); 1980; 200-204 (German)

Xanthenes, admitted as additive in food industry, are obtained from microorganisms such as *Xanthomonas campestris*. The microorganism is grown in a fermenter. Glucose, nitrogen compounds and various salts are added to support the growth of the microorganisms. Xanthene is chemically a high molecular anionic polysaccharide. Its technological properties - such as stabilizing capacity, temperature stability, salt compatibility, pseudo plasticity - render xanthene a useful additive in the food industry, especially in the manufacture of mayonnaise, beverages, salad dressings, salad sauces and fancy cakes.

2175 SCHERZ (H) and MERGENTHALER (E). Analytical determination of polysaccharide thickening agents for foods: A review. *Z. Lebensmittel-Unters. Forsch.* 170(4); 1980; 280-86

In this report, the analytical methodology, as developed by the authors for polysaccharides, used as thicknening agents in foods is reviewed and

summarized. The analytical methodology consists of the following steps: a) Isolation of the polysaccharides from the food samples; b) purification of the polysaccharide; c) determination of the monomeric compounds by thin layer chromatography or by gas chromatography, d) separation into neutral and into acid compounds by ion exchange chromatography on DEAE - Cellulose; and e) determination of the types of linkages between monomeric compounds by permethylation. AA

2176 ANON. New uses for carrageenan. *Food Eng. Int.* 6(4); 1981; 48-9

CEREALS

2177 KASTENMULLER (S). Volumetric dosage for the production of flour blends. *Getreide-Mehl. Brot.* 34(5); 1980; 123-5 (German)

Weighing is a costly procedure in a flour mill, and the need for weighing goes on increasing. Hence, a method of volumetric dosing has been devised, using conical multiple screws, with continuous regulation, of the r.p.m. The accuracy of dosing attained is 1-2%. KMD

2178 MONGEAU (R) and BRASSAD (R). Rapid digestion of starch and artefact fibre in the measurement of neutral detergent fibre of cereal products. *Getreide-Mehl. Brot.* 34(5); 1980; 125-7 (German)

Errors in the estimation of fibre in cereal products may be caused by the presence of undecomposed, residual starch. Hence, the yields of NDF (neutral detergent fibre) were investigated using two, commercial α-amylase preparates. Rapid decomposition with an α-amylase from *Bacillus subtilis* (ABS) removed the starch efficiently, but not the other artefacts formed during toasting. When the incubation period with ABS, was increased, the hemi-cellulose fraction was also attacked. A new method using α-amylase from pig pancreas (APP) has been described which decomposes the residual starch as well as the artefacts in 65 minutes. KMD

2179 DWYER (E), CORMICAN (C),and FLYNN (S). Testing grain moisture meters. I. Foss electric super-matic. *Farm. Food Res.* 11(6); 1980; 164-6

2180 DWYER (E), O'SULLIVAN (L) and CORMICAN (C). Testing grain moisture meters. 2. Performance of four rapid moisture meters. *Farm. Food Res.* 11(6); 1980; 167-9

RICE

2181 TENGENDJAJA (B), BUCKLE (KA) and WOOTTON (M). Dephosphorylation of phytic acid in rice bran. *J. Food Sci.* 46(4); 1981; 1021-4

Incubation time and temperature, moisture content, and pH were examined to determine the conditions necessary for the hydrolysis of phytic acid in rice bran. The extent of hydrolysis increased with increase in moisture content and autoclaving for 1 hour at 121 C destroyed a significant proportion of the phytic acid at high moisture contents. Maximum hydrolysis of phytic acid occurred by heating at pH 4.5. Incubation of rice bran slurry for 24 hour at 55 C, pH 5.1 reduced the phytic acid level by approximately 80%. AA

2182 ANANTHACHAR (TK), NARASIMHA (HV), SHANKARA (R), GOPAL (MS) and DESIKACHAR (HSR). Improvement of the traditional process for rice flakes. *J. Food Sci. Technol.* (India) 19(2); 1982; 47-50

Traditional methods of making rice flakes (Beaten rice, Poha, Avalakki) gave 62-64% yield in four varieties of paddy tested. Causes for the low yield have been traced to non-standardised process conditions and the high breakage occurring in the final stages of flaking. Soaking paddy (variety 'China' 'CH45') in water for 18 hours at 70 C, roasting in hot sand at 260 C for 31-35 seconds, tempering for 4 minutes followed by flaking in edge-runner for 40-45 seconds were found to be optimal for flaking and resulted in 2% increased yield as compared to traditional method. Making thick flakes in the edge-runner followed by thin flaking in a roller type flaker further increased the yield by 3%. AA

2183 DUNG (NV), BOWREY (RG) and FOWLER (RT). An equation for the rate of drying of paddy rice. *Food Technol. Aust.* 33(1); 1981; 20-1

The rate at which paddy rice will dry when exposed to a moving air stream can be calculated from the following equation:

$$dM/dt = -P_1(1 + P_3(MR)P_4)(M - M_e)e^{P_2M}$$

In this equation the parameters P_1, P_2 and P_3 are functions of temperature. The parameter P is a function of temperature and moisture ratio. This equation is valid for temperatures between 15 and 35 C, initial moisture contents between 18 and 28% (dry basis) and for an air velocity of 0.02 m/s. The relative humidity of the air does not affect the equation. The values of moisture content calculated from the equation agree with the experimental data with a root mean square error of 0.19%. AA

2184 DUNG (NV), BOWREY (RG) and FOWLER (RT). Simulation of drying in ventilated paddy rice stores. *Food Technol. Aust.* 33(4); 1981; 173-5

A computer program has been developed to simulate the in-store drying of paddy rice in which grain at approximately 25% (dry basis) moisture content is dried in bulk storage bins by ventilating with ambient air. The program predicts the temperature and humidity of the air within the storage bin, and the temperature and moisture content of the grain, as a function of time and position in the bin. Volume-averaged differential equations representing material and energy balances at any region within the bed have been solved using a fourth order Runge-Kutta method. The program allows for variations in the ambient conditions during ventilation and for condensation within the grain bed that can occur when the air is cooled by the grain. The predictions from the simulator compare satisfactorily with the data obtained in an experimental drier. AA

2185 NIERLE (W), ELBAYA (AW) and WOLF (J). Loss of substances accompanying rice cooking in excess water. *Chem. Mikrobiol. Technol. Lebensm.* 7(1); 1981; 9-12

Cooking of rice in excess water leads to losses of solids. The total solids content expressed as percent of raw rice, ranged between 1 and 5.7%. This variation may be due to the surface characteristics of rice kernels. The protein,ash and fat contents decreased while the amylose content remained constant. It is significant that the decreases in the ash and fat contents are higher than that of protein content. Most of the amino acids, except ornithine and valine, were found in the cooking water of the rice samples. Sucrose, glucose, and maltotriose were identified in different

amounts in the residual cooking liquids. During cooking of rice in excess water, considerable losses of surface and bound lipids occurred. AA

2186 NORMAND (FL), ORY (RL) and MOD (RR). Interactions of several bile acids with hemicelluloses from several varieties of rice. *J. Food Sci.* 46(4); 1981; 1159-61

Purified and crude preparations of rice hemicellulose from rice bran, whole rice (brown rice), and milled rice were incubated with four bile acids (cholic, glycocholic, taurocholic, and glycotaurocholic acids) under *in vitro* conditions of pH, temperature, salinity, time for interaction and so forth to approximate conditions normally found in the intestinal tract. The amounts of bile acids bound gradually increased as the concentration of rice extract increased for all rice varieties, with whole rice extract or rice bran extract. Results suggest an effect of growing areas on the binding properties of rice bran and milled rice. AA

2187 SINGH (KP), PANDEY (SY) and KAPADIA (GD). Note on carbaryl and lindane residues in and on rice. *Indian J. Agric. Sci.* 51(11); 1981; 824-6

Rice grains from crops treated (30 and 58 days after transplantation) with sevidol (which contains 4% carbaryl, 4% lindane, 27% other isomers of hexachlorocyclohexane and 65% inert material) at 1.0 and 1.5 kg ai/ha were analysed at harvest (15 to 34 days after the last application). The carbaryl residues in or on whole grain varied from below detectable level (BDL) to 0.79 ppm, which was lower than the Indian tolerance limit of 1.5 ppm on food grains and 5.0 ppm prescribed by FAO/WHO for rice. Lindane residues varied from BDL to 0.23 ppm which was below Indian tolerance limit of 0.25 ppm for food grains and 0.50 ppm prescribed by FAO/WHO. Whole grain samples showed BDL at application rate of 1.0 kg ai/ha, whereas with 1.5 kg ai/ha, residues were more, varying from BDL to 0.79 ppm. MVG

WHEAT

2188 WEIPERT (D). Evaluation of wheat quality by using a rotation-viscometer. *Getreide-Mehl Brot.* 34(5); 1980; 113-8 (German)

The application of a recently developed and described method for the early recognition of the quality and dough properties in wheat breeding has been discussed. The apparatus and the method chosen for drawing the flow curves (gelatinization curves) combine in themselves a few advantages which are of particular interest to the breeder: (1) the measurement requires little material; (2) the measurement can be done either on flour or on meal; (3) the measurement is simple, and well reproducible, and quick; (4) the results of the measurements agree well with the results of other more direct methods of quality assessment and the Rapid Mix Test; (5) the results are obtained in the form of a flow curve which is typical and also characteristic for a certain type of dough behaviour, just like the well-known farinogram and extensogram curves; (6) it is possible to represent the results in absolute physical units, which would permit a direct comparison with the results obtained with rotation viscometers of other types and with different systems of measurement; (7) within a laboratory, or by using the same methodology and measurement parameters, the results can be compared and evaluated in millimeter units of the graph paper, without any recalculation. KMD

2189 KUMAR (R) and SINGH (R). The relationship of starch metabolism to grain size in wheat. *Phytochemistry.* 19(11); 1980; 2299-303

2190 GUPTA (OP) and MOHAN (M). Economic return to farmers in wheat storage. *Agric. Situation India.* 36(10); 1982; 741-3

2191 DHILLON (GS), SINGH (A) and KALRA (MS). Single-cell protein production from wheat straw and its fractions by *Myrothecium verrucaria.* *J. Food Sci. Technol.* (India) 19(2); 1982; 74-8

Wheat straw consists of 68% holocellulose (25% hemicellulose and 43% cellulose). *Myrothecium verrucaria* was grown for single-cell protein (SCP) production on whole straw and its cellulosic fractions such as holocellulose and cellulose. Five days incubation period with 0.05 g N-ammonium dihydrogen ortho-phosphate/1., with pH of 4.5 and cellulose as the sole source of carbon proved optimum for maximum (30.5%) SCP production. *M verrucaria* biomass contained all the essential amino acids except the S-amino acids. KAR

2192 LORENZ (K) and VALVANO (R). Functional characteristics of sprout-damaged soft white wheat flours. *J. Food Sci.* 46(4); 1981; 1018-20

Flour from wheat sprouted in the laboratory for 1,2 and 4 days were used to bake cakes and cookies to determine thickening powers. Sprouting the grain for more than one day resulted in cake baking quality in that the cakes were low in volume had dips in the centre, and had a coarse grain and firm texture. Longer sprouting, however, increased the cookie spreads and improved the cookie top grain score, though the crust colour got darkened. Sprouting did not affect flavour. The thickening power of the flour decreased with sprouting time of the grain. In general, laboratory sprouting had an adverse effect on flour functionality in soft wheat products. MVG

2193 TERADA (M), MINAMI (J) and YAMAMOTO (T). Rheological properties of dough made from flour exposed to gaseous ammonia. *Cereal Chem.* 58(2); 1981; 101-5

Dough from ammonia-treated flour showed increased resistance to extension and showed lower extensibility. BSN

2194 KILBORN (RH), TWEED (AR) and TIPPLES (KH). Dough development and baking studies using a pilot scale dough brake. *Baker's Dig.* 55(1); 1981; 18-31

The different ways by which the dough brake rolls might be used are discussed, with reference to the production of bread dough. It is concluded that further development and innovation would be required before dough brake techniques could be successfully incorporated into commercial operations. KAR

2195 KIEFFER (R) and GROSCH (W). Improvement of dough and baking properties of wheat flour by type II. Lipoxygenase from soyabeans. *Z. Lebensmittel-Unters. Forsch.* 170(4); 1980; 258-61 (German)

The improver action of both soyabean flour extracts and purified type II lipoxygenase (EC 1.13.11.12) on wheat flours of normal and poor baking qualities was studied by microscale measurements of dough rheology and by microscale baking tests. Presence of lipoxygenase in the dough extended the mixing tolerance, increased dough stability and enhanced the loaf volume of the bread. This significant improver effect was also observed with flours of poor quality which in addition showed better handling

characteristics. Addition of linoleic acid to doughs with lipoxygenase, resulted in a further increase of dough strength. The improver effect of soyabean extracts was less than that of the purified enzyme. AA

MILLETS

SORGHUM

2196 MURTY (DS), PATIL (HD), PRASADA RAO (KE) and HOUSE (LR). A note on screening the Indian sorghum collection for popping quality. *J Food Sci. Technol.* (India) 19(2); 1982; 79-80

The Indian sorghum germplasm collection (3682 accessions) maintained at the ICRISAT Center, Hyderabad, was screened for superior pop sorghums and 36 accessions exhibited more than 80% popped grains per sample were identified. In general, the pop sorghums possessed a small grain size, medium thick pericarp, hard endosperm and a very low germ/endosperm size ratio. AA

MAIZE

2197 KROCHTA (JM), LOOK (KT) and WONG (LG). Modification of corn wet-milling steeping conditions to reduce energy consumption. *J. Food Process. Preserv.* 5(1); 1981; 39-47

Laboratory corn wet-milling experiments were conducted with modified operating conditions. Mill-starch yield obtained from corn steeped at reduced steep solution volume was comparable to normal operation as long as the absolute amount of steeping agent, SO_2, remained the same. Increasing the SO_2 concentration or removing the mass transfer barriers between the endosperm and the steep solution by degerminating between two steeping periods improved mill-starch yield. These modifications have potential for saving energy consumed in steeping and in concentrating residual steep solution. AA

2198 KROCHTA (JM), LOOK (KT), HUDSON (JS) and PAVLATH (AE). Extraction with ethanol as an energy-saving alternative to conventional drying of corn starch. *J. Food Sci.* 46(4); 1981; 1054-8, 1063

Drying of starch derived from corn wet-milling is an energy intensive operation in an energy intensive industry. An alternative to conventional drying involves extraction of water from starch with an ethanol solution and reconcentration of ethanol by distillation. Equilibrium data for starch with various concentrations of ethanol in water were obtained. These data were used to calculate the effect of multistage counter-current extraction of mechanically dewatered starch using a mathematical model of the process. The energy required for drying the extracted starch and recovering the alcohol is predicted to be considerably less than that required for conventional drying. Energy savings up to 40% and more are possible. AA

2199 JOSHI (S), LODHA (ML) and MEHTA (SL). Regulation of starch biosynthesis in normal and opaque-2 maize during endosperm development. *Phytochemistry.* 19(11); 1980; 2305-9

2200 MAY-GI LAY (M) and FIELDS (ML). Nutritive value of germinated corn and corn fermented after germination. *J. Food Sci.* 46(4); 1981; 1069-73

Germination significantly ($P < 0.01$) increased the amounts of ascorbic acid, riboflavin and niacin in corn. Fermentation after germination gave significantly ($P < 0.01$) increased amounts of riboflavin and niacin than in ungerminated corn, but not in germinated corn; there was significant increase ($P < 0.01$) in relative nutritive value (% RNV) over that of ungerminated and germinated corn. Chips made from germinated and germinated-fermented corn were significantly ($P < 0.05$) higher in riboflavin, niacin and % RNV, and were acceptable organoleptically. Fresh corn sprouts were significantly ($P < 0.01$) sweeter and more bitter than mung bean sprouts. MVG

2201 RAMA DEVI (G) and POLASA (H). Mycotoxins from fungi on maize. *Curr. Sci.* 51(15); 1982; 751

50 maize samples from poultry feed factories in Hyderabad, India, were studied for contamination by mycoflora and mycotoxins. The mycoflora consisted of *Aspergillus flavus*, *A candidus*, *A sydowi* and *Penicillium* sp. Aflatoxin B_1, B_2 and G in 5 samples, ochratoxin in 6 samples and sterigmatocystin in three samples were detected. In three samples, the amounts of aflatoxin present were 34, 40 and 105 ppb, which is above the tolerance level. Ochratoxin and sterigmatocystin levels ranged from traces to 187 ppb and traces to 150 ppb respectively. MVG

2202 SEENAPPA (M) and NYAGAHUNGU (IK). Retention of aflatoxin in *ugali* and bread made from contaminated maize flour. *J. Food Sci. Technol.* (India) 19(2); 1982; 64-5

Maize flour was contaminated with aflatoxins by growing *Aspergillus parasiticus* (NRRL 3145); and *ugali*, a traditional staple dish in Africa, was cooked from the contaminated whole maize flour. Bread was baked from a composite flour that contained 10 parts of the aflatoxin contaminated maize flour and 90 parts of uncontaminated wheat flour. The ready-to-eat *ugali* still contained 199.1 mg/kg aflatoxin B ($B_1 + B_2$) and 206 mg/kg of aflatoxin G ($G_1 + G_2$), amounting to retention percentages of 88.5 and 82.4 respectively. In bread, retention was 83.8% for aflatoxin B ($B_1 + B_2$) and 67.8% for aflatoxin G ($G_1 + G_2$). Aflatoxin B was retained more than G in both *ugali* and bread. KAR

PULSES

2203 GEERVANI (P) and THEOPHILUS (F). Effect of home processing on the nutrient composition of certain high yielding legume varieties. *Indian J. Nutr. Dietet.* 17(12); 1980; 443-6

A study on the effect of home processing on the nutrient composition of red gram variety Hyderabad 3A, black gram variety T9, green gram variety PS16 and Bengal gram variety BEG 482 was carried out. The nutrients analysed were proximate principles, calcium, phosphorus, iron, thiamine, riboflavin and niacin. The per cent of lysine, threonine, methionine, cystine and tryptophan was also determined. The processing methods tested were boiling, pressure cooking, roasting, fermentation and germination. The per cent of proximate principles did not differ very much. Black gram, Bengal gram, and green gram had higher amount of tryptophan and sulphur amino acids compared to red gram. BSN

2204 CHANDER (H) and AHMED (SM). Extractives of medicinal plants as pulse protectants against *Callosobruchus Chinensis* L. infestation. *J. Food Sci. Technol.* (India) 19(2); 1982; 50-52

Petroleum ether extractives (PEE) of nine plant species - *Carum roxburghianum* Benth. and Hook, *Saussurea lappa* Clarke, *Embelia ribes* Burm, *Withania somnifera* Dunal, *Psoralea corylifolia* Linn., *Clerodendron inerme* (Linn.) Gaertn., *Cestrum nocturnum* Linn., *Caesalpinia bonduc* (Linn.) Roxb. and rice bran oil have been tested against *Callosobruchus chinensis* Linn. infesting green gram, *Phaseolus mungo* Linn. PPE of *C. roxburghianum* at 0.1 % level. Rice bran oil at 0.2 and 0.5% levels and *P. corylifolia* at 0.5% level, gave almost complete protection of the pulse up to 135 days, while *S. lappa* and *W. somnifera* at 0.1% and *E. ribes* at 0.5% protected up to 90 days. However, *C. bonduc*, *C. nocturnum* and *C. inerme* comparatively were less effective against the bruchid attack. The germination test showed that the treatments did not have any adverse effect on seed viability. AA

2205 WILSON (KA). The release of proteinase inhibitors from legume seeds during germination. *Phytochemistry.* 19(12); 1980; 2517-9

The seeds of twelve common species of legumes were examined for the release of proteinase inhibitor activity during germination. All species released inhibitory activity against bovine trypsin (EC 3.4.21.4), ranging from 1.0 unit per g dry weight of seed in 24 hours for soyabean (*Glycine max*), to 0.07 unit per g for broad beans (*Vicia faba*) and sugar pod peas (*Pisum sativum*). This release corresponds to approximately 1-13% of the total trypsin inhibitory activity of the seed, with lentils (*Lens culinaris*) releasing the greatest percentage, and the scarlet runner bean (*Phaseolus coccineus*) the least. In most species the amount of inhibitor released increases until 24-48 hours of germination, and then remains roughly the same or decreases slightly by 72 hours of germination. Five species of legumes were also examined for the release of inhibitory activity against bovine chymotrypsin (EC 3.4.21.1). In each case chymotryptic inhibitory activity was released in a manner similar to the trypsin inhibitor. AA

2206 SALUNKHE (DK). Legumes in human nutrition : Current status and future research needs. *Curr. Sci.* 51(8); 1982; 387-94

The problems with the use of legumes in human nutrition including the beany off flavour, long cooking time, sulphur amino acid deficiency and presence of antinutritional/toxic factors have been covered. The research needs and possible solutions to the above problems are pointed out. MVG

PIGEON PEA

2207 SHRIVASTAVA (SK) and BAJPAI (RK). A study of some toxic constituents of five new varieties of pigeon pea (*Cajanus Cajan* (L) Mill sp.). *Curr. Sci.* 51(14); 1982; 703-4

Five varieties of pigeon pea (*Cajanus cajan* var. T-21, JA-9-19, JA-3, Gwl-3, and JA-15) were studied for cyanogenetic glycosides, tannins, and phytohaemagglutinins. The cyanide content of the seeds varied from 0.45 to 0.70 mg HCN/100g seed. Highest cyanide content (0.70 mg HCN/100g seed) was in variety JA-3 and lowest (0.45 mg HCN/100 g seed) was in JA-15. The tannin content ranged from 0.33 to 1.26%; it was highest in variety Gwl-3 (1.26%) and lowest in JA-15 (0.33%). The agglutinating effect when studied

on the blood of rabbit, goat and sheep showed no positive effects. The overall data indicate that the percentage of different toxic principles in the five varieties of pigeon pea were comparatively small. MVG

BENGAL GRAM

2208 UDAYASEKHARA RAO (P). Protein and amino acid content of high yielding varieties of Bengal gram (*Cicer arietinum*) and their dialled crosses. *Indian J. Nutr. Dietet.* 17(11); 1980; 408-9

HARICOT BEAN

2209 JUNQUEIRA (RG) and SGARBIERI (VC). Isolation and general properties of lectins from the bean (*Phaseolus Vulgaris* Var. Rosinha G2). *J. Food Biochem.* 5(3); 1981; 165-79

2210 WHITAKER (JR) and SGARBIERI (VC). Purification and composition of the trypsin-chymotrypsin inhibitors of *Phaseolus vulgaris* L. var. Rosinha G2. *J. Food Biochem.* 5(3); 1981; 197-213

2211 SGARBIERI (VC) and WHITAKER (JR). Partial characterization of trypsin-chymotrypsin inhibitors from bean (*Phaseolus Vulgaris* L. var. Rosinha G2). Chemical and physical properties. *J. Food Biochem.* 5(3); 1981; 215-32

WHITE BEAN

2212 SAHASRABUDHE (MR), QUINN (JR), PATON (D), YOUNGS (CG) and SKURA (BJ). Chemical composition of white bean (*Phaseolus vulgaris* L.) and functional characteristics of its airclassified protein and starch fractions. *J. Food Sci.* 46(4); 1981; 1079-81,1087

White bean (4 varieties) and its air-classified fractions were analysed for amino acid and proximate compositions. The protein content of the beans ranged from 23.2-27.0% and the average protein fraction yield was 32% by weight accounting for 79.9% of the total protein in the dehulled cotyledons. The air-classified protein fraction had 50.3-57.5% protein, the solubility of which varied from 81.1-83.0% (% of total N soluble at pH 7.5). The functional properties (water hydration and heat thickening) of the protein fraction were similar to those of other vegetable proteins. Amino acid composition was typical of the legume seed proteins, with a high lysine and a low sulphur amino acid content. The starch fraction (53% by weight) had an average of 30% amylose and gave a torque-temperature curve typical of legume starches. The lipids and oligosaccharides were concentrated in the protein fraction. The stachyose content of the protein fraction was on the average four times that of starch fraction accounting for more than 50% of the total. The high levels of stachyose and raffinose in the protein fraction may call for further processing for its utilisation as a food ingredient. MVG

GREAT NORTHERN BEAN

2213 SATHE (SK) and SALUNKHE (DK). Isolation and partial characterization of an arabinogalactan from the Great Northern bean (*Phaseolus vulgaris*). *J. Food Sci.* 46(4); 1981; 1276-7

A trichloroacetic acid - soluble polysaccharide of the Great Northern bean (*Phaseolus vulgaris* L.) was isolated. Arabinose and galactose were the major constituents of this polysaccharide (92.5% of the total mass). The arabinose to galactose ratio was 2.0:1.7. Viscosity of the aqueous polysaccharide dispersion was concentration, temperature, and pH dependent. Highest viscosity for a 0.5% (w/v) aqueous dispersion was observed at a pH of about 6.0 AA

OILSEEDS AND NUTS

2214 ANON. International Congress on Oilseeds and Oils and 34th Annual Convention of the Oil Technologists Association of India, New Delhi, 9-13 Feb., 1979. *J. Oil Technol. Assoc. India.* 12(4) ; 1980; 169-96

Abstracts of 145 papers read at the International Congress on Oilseeds and Oils and 34th Annual Convention of the Oil Technologists Association of India have been presented under the following headings: Agronomy of oilseeds (19 papers); Newer sources of oils and fats (21 papers); Stability of oils and fats (12 papers); Analytical technologies and quality control (20 papers); Biosynthesis, metabolism, nutrition and toxicology (19 papers); Process technology and product development (43 papers) and Appropriate technology for developing countries (11 papers). KMD

SOYABEAN

2215 BORCHERS (R). Raw soyabean meal : Improved protein quality after aqueous ethanol extraction. *J. Food Biochem.* 5(3); 1981; 181-3

Extraction of raw soyabean meal with 40% ethanol in water and a short autoclaving yields a residue which supports a growth rate 27% greater than that of conveniently autoclaved meal when fed to weanling male rats. This residue contains an average of 73% of the dry matter and 91% of the protein of the original raw meal. AA

2216 CARMAN (GM), HARRINGTON (GF) and AMEGAH (R). Microsomal-associated glycerophosphate acyltransferase activity in germinating soyabeans. *J. Food Biochem.* 5(3); 1981; 185-95

2217 AOKI (H), TANEYAMA (O), ORIMO (N) and KITAGAWA (I). Effect of lipophilization of soy protein ion its emulsion stabilizing properties. *J. Food Sci.* 46(4); 1981; 1192-4

Effect of lipophilization (increase of the hydrophobicity of the protein molecule of modification, with a consequent increase of affinity to relatively nonpolar compounds) on emulsion stabilizing properties (ES) of soy protein (SP) molecule was studied. The properties of alcohol-modified, acetylated, partially-hydrolysed and unmodified SP were compared for this purpose. In modified SPs, ES was high even in the slightly acidic region while protein solubility was low; in unmodified SP, the ES decreased with the decrease of protein solubility. Modifications decreased the hydrophilelipophile (HLB)balance and increased Es. Ethanol modification increased tyrosine of SP determined by UV difference spectra and the hydrophobic region of the surface of the SP molecule. The increase of ES of modified

SP was linear with increase in fluorescent intensity and intrinsic viscosity. These findings as well as the nature of effect of alcohols on globular findings, indicated that lipophilization of the SP molecule is one of the primary factors concerned with the increase of ES in the slightly acidic region. MVG

2218 ASHRAF (H-RL) and SNYDER (HE). Influence of ethanolic soaking of soyabeans on flavour and lipoxygenase activity of soymilk.. *J. Food Sci.* 46(4); 1981; 1201-4

Soymilks were prepared from soyabeans soaked in 15% ethanol and in 15% ethanol plus 0.1M NaOH, 0.1M Na_2CO_3 or 0.1M $NaHCO_3$ for various times at 60 C. The ethanol was removed before processing the soyabeans into soymilks, and the soymilks were analyzed for composition, lipoxygenase activity, TBA number, and flavour (paintiness, grassiness, nuttiness, cereal, and astringency). The change in paintiness with time of soaking did not depend only on lipoxygenase activity or on TBA number, but was related to the soaking conditions. Soaking in 0.1M NaOH gave soymilks with more paintiness than soaking in either 0.1M Na_2CO_3 or $NaHCO_3$. AA

GROUNDNUT

2219 SREEDHARA (N) and SUBRAMANIAN (N). Physicochemical properties of hydrogen peroxide treated groundnut protein. *J. Food Sci.* 46(4); 1981; 1260-64,1268

Hydrogen peroxide treatment of groundnut meal dispersion or protein extract effectively destroyed any aflatoxin present in the meal. However, the protein isolated from this extract showed reduced nitrogen solubility in the pH range 2-6, increased apparent viscosity at neutral pH, and marked reduction in the content of methionine, cystine, and available lysine. Arachin isolated from the hydrogen peroxide treated protein did not differ in polyacrylamide gel electrophoresis and ultracentrifugation properties compared with untreated arachin. AA

BRASSICA

2220 GUPTA (SK), SEKHON (KS) and AHUJA (KL). Chemical composition of *Brassica* seeds. *J. Food Sci. Technol.* (India) 19(2); 1982; 84-6

Four varieties, each of *Brassica campestris* and *Brassica juncea*, were studied for their chemical composition. Oil content and mineral content of the two species showed little variation. *B. campestris* had higher protein, crude fibre and lower content of allylisothiocyanates than *B. juncea*. Lysine and methionine were more in *B. campestris* as compared to *B. juncea*. Thus *B. campestris* is found to be nutritionally superior to *B. juncea*. AA

HAZELNUT

2221 DIAZ MARQUINA (A), TORIJA ISASA (ME) and VALLS PALLES (C). Mineral elements in different varieties of hazelnuts grown in the province of Tarragon, Spain. *An. Bromatol.* 32(1); 1980; 41-8 (Spanish)

The contents of Na, K, Ca, Mg, Cu, Fe, Mn and Zn in 23 samples of hazelnuts have been reported. An intake of 100 g of hazelnuts would cover

the daily requirement of Mg and Cu, and one-fourth of the daily requirements of Ca, Fe, Zn and Mn; they would also supply a reasonable quantity of K, and a very small quantity of Na. KMD

TUBERS AND VEGETABLES

2222 BARUDI (W) and BIELIG (HJ). Heavy metal content (As, Pb, Cd, Hg) of vegetables which grow above ground and fruits. *Z. Lebensmittel Unters. Forsch.* 170(4); 1980; 254-7 (German)

157 samples from 16 varieties of vegetable, whose above ground tissues are consumed, and 83 samples from 6 varieties of fruit were examined by atomic absorption spectroscopy for arsenic, lead and mercury contamination. Leafy vegetables were found to be more heavily contaminated than the other vegetable varieties. Fruits without exception had less heavy metal than vegetables. The results obtained were compared with the guideline values of the German regulatory authority ZEBS and with the recommendations of WHO for weekly tolerance values for lead, cadmium and mercury. It was determined that the average weekly exposure of the population of the FRG is below the maximum tolerance level. AA

POTATO

2223 MAGA (JA). Total and individual glycoaklaloid composition of stored potato slices. *J. Food Process. Preserv.* 5(1); 1981; 23-9

The quantitation of α-chaconine and α-solanine by thin-layer chromatography agreed with the total glycoalkaloid (TGA) content as determined by titration. The TGA level of potato slices approximately doubled to 26-30 mg/100g fresh weight during the 7 hour incubation period. Soaking of potato slices resulted in lower increases. Incubation at 25 C resulted in higher TGA levels than at 5 C. The initial α-chaconine/ α-solanine ratio was 1.42, but with time and temperature changed to 2.4-2.8 in unsoaked slices and 1.5-1.6 in soaked slices. AA

2224 NIPHADE (DB) and MAHAJAN (PR). Note on the culinary quality studies of some potato strains. *Andhra Agric. J.* 27(5/6); 1980; 324-5

Culinary qualities of new potato varieties (C 990, F 3349, F 6370, *Kufri Jyoti* and *Kufri Chandramuhki*) were evaluated by sensory methods. The parameters tested were time taken for cooking, appearance after cooking, peeling quality, consistency of flesh and taste. *Kufri* variety had the best culinary quality and was preferred by housewife than other varieties. MVG

2225 JOSEFSSON (E), ANDERSSON (A) and OHLIN (B). Pesticide residues in sprayed and non-sprayed potatoes. *Var Foda.* 32(8); 1980; 409-14 (Swedish)

48 samples of conventionally cultivated potatoes and 36 samples of "non-sprayed" potatoes were analyzed for chlorinated pesticides, dithiocarbamates, captafol, metribuzin, and chlorothalonil. No pesticide residues were found in the "non-sprayed" samples. Metribuzin was detected in one sample, dieldrin in three samples, and lindane in one sample of conventionally cultivated potatoes. All the residues were far below the maximum acceptable levels. KMD

2226 SINGH (KP), PANDEY (SY) and KAPADIA (GD). Note on carbaryl residues in and on potato. *Indian J. Agric. Sci.* 51(8); 1981; 607

Potato variety Chandramukhi harvested (i.e. 36th day after the last application) from crop treated on the 56th day with Sevin-50 WP (0.75 and 1.25 Kg ai/ha) and sevinol - 40 LV (0.75 and 1.2 Kg ai/ha) with repeated treatment within 10 days, were examined for carbaryl residues. The residues were not detectable (i.e. < 0.03 ppm) in such potatoes. MVG

2227 WAGNER (JN). Crunchier texture for frozen foods. Key is addition of potato flakes to batter. *Food Eng. Int.* 6(4); 1981; 36-8

SWEET POTATO

2228 BIRADAR (RS) and ANNAMALAI (V). Growth rates in area, production and productivity of sweet potato. *Agric. situation India.* 36(10); 1981; 751-3

TAPIOCA/CASSAVA

2229 JOS (JS), HRISHI (N), MAINI (SB) and NAIR (RG). Two high yielding hybrids of cassava. *J. Root Crops.* 6(1&2); 1980; 1-6

2230 PUHAZHENDHI (V) and RAMASAMY (C). Temporal growth of area, production and productivity of tapioca in Tamil Nadu. *J. Root Crops.* 6(1&2); 1980; 7-10

2231 RAJESWARI AMMA (K). A rational price for tapioca. *J. Root Crops.* 6(1&2); 1980; 11-4

2232 NAIR (PG), MOHAN KUMAR (B) and RAJENDRAN (N). Effect of different sources of potassium on the yield and quality of cassava. *J. Root Crops.* 6(1&2); 1980; 21-4

2233 COLLINS (JL) and TEMALILWA (CR). Cassava (*Manihot esculenta* Crantz) flour fortification with soy flour. *J. Food Sci.* 46(4); 1981; 1025-8

A flour was prepared from "sweet" cassava tubers. Cyanogenic acid content was 24.4 mg/kg of flour. Proximate analysis was made; crude protein content was 2.1%. Soy flour with 53.8% protein was used to fortify cassava flour at 5, 10, 15, and 20%. Quality of the cassava flour protein was very low; addition of soy raised the quality. Protein efficiency ratio of 80% cassava-20% soy composite flour was 1.55 when fed to rats. Rats receiving diets with 100% cassava, and 95% cassava-5% soy lost body weight. Diets with 90% cassava-10% soy caused no change in body weight. Soy softened the dough made from cassava-soy flours. Therefore, the smaller amounts of water needed to maintain a uniform dough consistency with increased levels of soy were determined. Dough became darker, more red and more yellow with increased amounts of soy. Panel scores for dough were increased with increased levels of soy upto 15%. Scores for appearance and eating quality for dough with 20% soy were lower than scores for dough containing no soy. AA

TARO

2234 TSAI (WYJ), MOY (JH), NIP (WK) and FRANK (HA). *Aspergillus parasiticus* growth and aflatoxin production on dehydrated taro. *J. Food Sci.* 46(4); 1981; 1167-9

Growth of and aflatoxin production by *Aspergillus parasiticus* on dehydrated taro during storage were studied. Optimum growth conditions were determined with a non-toxigenic strain of A. *parasiticus*. The critical equilibrium relative humidity (ERH) for natural mold growth on unsterilized product was 88% at 20 C. But,non-toxigenic strain did not grow at this ERH on raw dehydrated taro incubated at 20,30 or 40 C. Instead, its growth was optimum at 30 C and ERH of 96%. Aflatoxin production by toxigenic strain was also investigated on four taro media under optimum conditions of growth. On uncooked dehydrated taro, only moderate quantities of aflatoxin were produced. Cooking or supplementation with peptone stimulated mycelial growth and aflatoxin production slightly. MVG

2235 TSAI (WYJ), MOY (JH), NIP (WK) and FRANK (HA). Stimulation of aflatoxin production in media supplemented with taro. *J. Food Sci.* 46(4); 1981; 1274-5

The effect of taro supplementation on aflatoxin production by *Aspergillus parasiticus* was studied on wheat and in the liquid synthetic glucose-low salts (GLS) medium of Adye and Mateles (*Biochem. Biophys. Acta.* 86; 1964; 418). Wheat containing added taro extract showed increased growth and sporulation and had 30% more aflatoxins. Adding 5% uncooked or cooked taro shreds to the liquid GLS medium increased toxin production two-to three-fold. AA

VEGETABLES

2236 CUMMING (DB), STARK (R) and SANFORD (KA). The effect of an individual quick blanching method on ascorbic acid retention in selected vegetables. *J. Food Process. Preserv.* 5(1); 1981; 31-7

Method of blanching (including cooling) was found to have a significant effect on residual ascorbic acid level in peas ($P < 0.01$) and broccoli ($P < 0.001$), but not cut green beans ($P > 0.05$). The separate parts of the procedure (heating and cooling) had an additive effect but acted independently of one another. In each case, where a difference was observed the experimental procedure (individual quick blanch/evaporative or "air":cool) was found to yield a product higher in ascorbic acid than the conventionally processed product (water blanch/water cool). The practical implication is that adoption of specialized steam blanch procedures or evaporative cooling will result in improved nutrient levels in sensitive vegetables (e.g. peas and broccoli) as compared to conventional product. The experiments also indicated that any contact of heat and water with susceptible vegetable materials will cause a marked reduction in ascorbic acid levels. For the vegetables studied, the K-1 individual quick blanch system yielded fully blanched product which retained mean ascorbic acid levels between 82 and 91% of raw values, depending on the specific vegetable. AA

2237 OSTROWSKI-MEISSNER (HT). Optimisation of protein extraction from pasture herbage quantitative and qualitative considerations. *J. Food Process. Preserv.* 5(1); 1981; 7-22

LEAFY VEGETABLES

2238 MAEDA (EE) and SALUNKHE (DK). Retention of ascorbic acid and total carotene in solar dried vegetables. *J. Food Sci.* 46(4); 1981; 1288-90

Four vegetables (African spinach, cow pea, sweet potato, and cassava leaves) were dried in the open sunshine and in enclosed conventional solar driers with and without shade provision. Total carotene and ascorbic acid content in the fresh leaves and in leaves dried under the three drying conditions were assayed. The study showed that maximum retention of the two vitamins is obtained by drying vegetables in enclosed solar drier with shade. Direct sun exposure of vegetables as often practiced in the tropics resulted in marginal retention of the two vitamins. AA

AMARANTHUS

2239 IRVING (DW), BETSCHART (AA) and SAUNDERS (RM). Morphological studies on *Amaranthus cruentus*. *J. Food Sci.* 46(4); 1981; 1170-74

2240 BETSCHART (AA), IRVING (DW), SHEPHERD (AD) and SAUNDERS (RM). *Amaranthus cruentus*: Milling characteristics, distribution of nutrients within seed components, and the effects of temperature on nutritional quality. *J. Food Sci.* 46(4); 1981; 1181-7

It was found that the nutrients in milled seeds were more highly concentrated in the seed coat-embryo fraction which contained 2.3-2.6 times as much nitrogen, fat, fibre and ash; 2.4-3 times the quantity of thiamine, riboflavin and niacin; and 1.4-2.5 times the concentration of several mineral elements as in the original, intact seed were present. Hot air popping resulted in a PER of 1.7 and an apparent nitrogen digestibility of 77% which did not differ significantly from those of control feed. MVG

2241 BECKER (R), WHEELER (EL), LORENZ (K), STAFFORD (AE), GROSJEAN (OK), BETSCHART (AA) and SAUNDERS (RM). A compositional study of amaranth grain. *J. Food Sci.* 46(4); 1981; 1175-80

Several amaranth grain species grown under varying agronomic conditions were studied for mineral and proximate composition. Also studied were saccharide content and the presence of saccharide hydrolysing enzymes. Representative samples were examined for amino acid composition, oil, fatty acid composition, selected vitamins and starch. MVG

SPINACH

2242 LEE (K) and CLYDESDALE (FM). Effect of thermal processing on endogenous and added iron in canned spinach. *J. Food Sci.* 46(4); 1981; 1064-8, 1073

In raw spinach, the endogenous iron was 93% in the insoluble form, while added iron varied mostly in degree of insolubility. In the case of some iron sources, processing increased the proportion of insoluble and ferrous iron over those in raw spinach. Processing with ascorbate also increased ferrous iron in some cases. Ferric EDTA, however, was exceptional

in that it was least affected by processing with or without ascorbate. MVG

GUAR

2243 SINGH (SP) and MISHRA (BK). Lipids of guar seed meal (*Cyamopsis tetragonoloba* L.Taub.). *J. Agric. Food Chem* 29(5); 1981; 907-9

The lipids of guar seed meal constituting 7% of weight of meal, considered as a waste product have been separated and identified by TLC. Fatty acid composition is made up of 24% saturated acid, 29% oleic acid and 47% linoleic acid. BSN

2244 NATH (JP) and NARASINGA RAO (MS). Functional properties of guar proteins. *J. Food Sci.* 46(4); 1981; 1255-9

Water and fat absorption, emulsification capacity (E.C.), foaming capacity (F.C.), and foam stability (F.S.) of guar meal and protein isolate have been determined and compared with those of soyabean meal and isolate. Guar meal had lower water absorption capacity, similar fat absorption capacity and greater F.S. and E.C. than soyabean meal. Guar protein isolate (GPI) had lower water absorption capacity, but higher fat absorption capacity than soy protein isolate (SPI). The foaming capacity and emulsification capacity were similar at all pH's except around pH 4. However, the foam stability of GPI was greater than that of SPI. AA

2245 KOCHAR (G), KAWATRA (BL) and BAJAJ (S). Evaluation of recipes with acid-treated guar meal. *Indian Food Packer.* 36(4); 1981; 25-8

The acid-treated guar meal is a rich source of protein and amino acids, particularly lysine. Incorporation of detoxified guar meal in cereal preparations may be acceptable without any adverse effect, 5% for a salty preparation (Mathi and Mattri) and at 10% for a sweet with sugar and at 15% with jaggery. AA

FRUITS

2246 SAURO CALIXTO (F) and BERMEJO (J). Obtainment of samples of fruit flavours for analysis by gas chromatography. *An. Bromatol.* 32(1); 1980; 77-84 (Spanish)

The extraction of fruit flavours from samples by steam distillation and by adsorption-desorption on charcoal have been compared. Steam distillation is better for extraction of samples with a large number of aroma components, and the results are similar to those obtained in industrial processes. But as a high temperature can alter some of the components, it is better to do the distillation under reduced pressure. The adsorption-desorption process on active carbon complements the distillation method. It results in higher values for low-boiling or water-soluble substances; it also enables one to determine components which are masked by the solvents used in the chromatograms. Nevertheless, the results are rather incomplete in the case of substances having a high level of carbon dioxide. Neither of these methods is better than the conventional method, and entails the disadvantage of water being present in the samples to be chromatographed. KMD

2247 CHANDAN (RC) and EREIFEJ (KI). Determination of lysozyme in raw fruits and vegetables. *J. Food Sci.* 46(4); 1981; 1278-9

Several fresh fruits and vegetable were tested for lysozyme activity The produce was weighed, diced, blended for 2 minutes and filtered through a cheesecloth. The filtrate was centrifuged at 2,000 x G for 15 minutes. The supernatant juice was clarified and stored frozen until the spectrophotometric assay was completed. Crystalline egg-white lysozyme was used as a standard. Average lysozyme concentrations per ml of the juice were: cauliflower 32.5 µg, rutabaga 13.0 µg, papaya 5.0 µg, cabbage 2.7 µg, kohlrabi 2.4 µg, and red radish 2.2 µg. Lysozyme (0.5-1.8 µg) was also detected in white radish, turnip, parsnip, and broccoli. Other vegetables and fruits tested showed no detectable lysozyme. AA

DATE

2248 MOHAMED (MA) and AHMED (AA). Libyan date syrup (Rub Al-Tamr). *J. Food Sci.* 46(4); 1981; 1162-6, 1174

2249 ZIEMKE (WH). Optimizing raisin use in the bakery. *Baker's Dig.* 55(1); 1981; 6-8

The article deals with raisin production in America, storage of raisin, composition of raisin, products that could be prepared from raisin, conditioning of raisin before use, control of yeast, use of crushed raisin, and retardation of mold growth in raisin added bakery products. KAR

GRAPE

2250 WILLIAMS (PJ), STRAUSS (CR), KLINGNER (KE), OBST (SR) and ANDERSON (GLG). Development of a process for the deodorization of spirit recovered from grape marc. *Food Technol. Aust.* 33(1); 1981; 12-13

Describes the ion-exchange units for the deodorization and operation on full industrial scale. KAR

BANANA

2251 YOSHIOKA (H), UEDA (Y) and CHACHIN (K). Inhibition of banana fruit ripening and decrease of protein synthesis at high temperature (40 C). Physiological studies of fruit ripening in relation to heat injury. Part III. *J. Jpn. Soc. Food Sci. Technol.* 27(12); 1980; 610-15

Mature-green banana fruit stored at 40 C failed to ripen. Both protein nitrogen (10% TCA-insoluble nitrogen) and total RNA content of banana fruit did not change during storage at both 20 C and 40 C. However, ^{14}C-valine incorporation into protein in pulp tissue of banana fruit was completely inhibited at 40 C. The ability of protein synthesis in the tissue was recovered from the inhibition after a certain lag period by transferring from 40 C to 35 C. The length of this lag period was dependent on the length of 40 C treatment and the subsequent incubation temperature. Incorporation of ^{14}C-uridine into RNA was suppressed slightly larger at 40 C than at 35 C, but continuous incorporation was observed at both temperatures. Actinmycin D, an inhibitor of RNA synthesis, did not prevent the recovery of protein synthesis from inhibition at 40 C. These results indicate that banana fruit held at 40 C failed to ripen by the decrease of protein synthesis caused by high temperature. AA

CITRUS

2252 NIGG (HN) and STAMPER (JH). Comparative disappearance of dioxathion malathion, oxydemetonmethyl and dialifor from Florida citrus leaf and fruit surfaces. *Arch. Environ. Contam. Toxicol.* 10(4); 1981; 497-504

2253 MOORTHY MALLIPUDI (N) and ROY FUKUTO (T). Characterization of bound phenthoate residues in citrus. *Arch. Environ. Contam. Toxicol.* 10(4); 1981; 505-10

LEMON

2254 ROMOJARO (F), BANET (E) and GIMENEZ (JL). Some contributions to the detection of adulterations of lemon juice. *An. Bromatol.* 32(1); 1980; 33-40 (Spanish)

Lemon juice made from several varieties grown in the South-East of Spain was analyzed for phosphorus, potassium, ammonia and amine nitrogen, and formol index; in addition, the contents of aspartic and glutamic acids, serine, proline, and alanine were studied with the help of statistical criteria. A good correlation was found between the content of real lemon juice and the following parameters: formol index, and the contents total nitrogen and potassium; a slightly poorer correlation existed between the content of real lemon juice, and the contents of ammoniacal and amine nitrogen, and of phosphorus. The differences in the measured and calculated values of aminoacids are rather wide, and especially so in the case of proline and alanine. KMD

ORANGE

2255 RAVICHANDRAN (V) and SULLIA (B). *Spiropes guariecola* (Stev.) Cif.causing a new storage disease of oranges. *Curr. Sci.* 51(3); 1981; 667

During a recent survey in Bangalore, the two fungi responsible for causing dark spots scattered irregularly on the loose jacket orange fruit (*Citrus aurantifolia*) were *Meliola* sp. (sooty mould) and *Spiropes guareicola* (Hyphomycate). These were found in samples collected from Bangalore (Karnataka, India) market. MVG

MANGO

2256 SHANTHA KRISHNAMURTHY. Effect of calcium and boron on the incidence of internal breakdown in Alphanso mango (*Mangifera Indica* Linn.). *J. Food Sci. Technol.* (India); 19(2);1982; 80-81

Calcium chloride (5000 ppm) and boric acid (500 ppm) separately and in combination were sprayed 3 times at monthly intervals starting from the fruit set. Neither preharvest sprays, nor post harvest dip at 2500 and 5000 ppm $CaCl_2$ at 28 C for 5 minutes could reduce the internal breakdown of mangoes. Ca level of the fruit did not increase by this treatment. KAR

CHERRY

2257 ANON. Cherry ripe. *Food Manuf.* 56(3); 1981; 61-3

PEACH

2258 BEN-ARIE (R) and SONEGO (L). Pectolytic enzyme activity involved in woolly breakdown of stored peaches. *Phytochemistry.* 19(12); 1980; 2553-5

The development of woolly breakdown in peaches stored at 0 C was accompanied by increased activity of pectinesterase (PE) and inhibition of polygalacturonase (PG) activity. With intermittent warming of the fruit, which delayed the development of woolly breakdown, PG activity increased to levels measured in normally ripened fruit. It is proposed that the development of woolly breakdown in cold-stored peaches derives from an imbalance of pectolytic activity, whereby low temperatures induce PE to cause the accumulation of de-esterified pectate (soluble in EDTA) and inhibit PG from degrading this substrate. AA

PLUM

2259 BOOTHBY (D). The pectic components of plum fruits. *Phytochemistry.* 19(9); 1980; 1949-53

Pectic substances were extracted from plum fruit tissue and the whole pectin, crude pectinic acid, purified pectinic acid and neutral fractions were prepared. Each of the fractions contained galacturonic acid, arabinose, galactose, xylose and rhamnose. High voltage electrophoresis indicated the presence of neutral and negatively charged material, and treatment with pectinesterase showed that the netural component was completely esterified. The three cultivars of fruits studied showed close similarities. The results are consistent with proposed models of pectin structure and indicate the probable existence of a continuous gradation with respect to degree of esterification and molecular size. AA

JUJUBA/BER

2260 SOOD (DR), WAGLE (DS), NAINAWATEE (HS) and SRIVASTAVA (HC). Quality attributes of some Ber (*Zizyphus Jujuba*) strains. *Indian J. Nutr. Dietet.* 17(12); 1980; 447-51

Seven ber CV. namely Umran, Kaithili, Kathaphal, Banarsi Karka, ZG-3, Rashmi and Illachi and five selections, viz. HS-1, Triloki-1, HS-4, HS-5 and Dandan were evaluated. The protein content ranged from 0.84 to 1.74%; fat, 0.13 to 0.26%; total ash, 0.34 to 0.72%; fibre, 0.77% to 3.84%; total carbohydrates 13.74 to 21.42% caloric value, 39.11 to 65.21 Kcal/100 g; total sugar, 9.88 to 18.52%; reducing sugars, 5.16 to 15.50%; non-reducing sugars, 2.67 to 11.07% pectin, 0.70% to 4.05% calcium, 20 to 82 mg/100 g; and iron, 0.58 to 1.39 mg/100 g. Among the varieties, Kathaphal had the highest carbohydrates content (21.42%), while Illachi had the highest caloric value. BSN

2261 CYONG (J-C) and HANABUSA (K). Cyclic adenosine monophosphate in fruits of *Zizyphus jujuba*. *Phytochemistry*. 19(12); 1980; 2747-8

PEAR

2262 RUSSELL (LF), QUAMME (HA) and GRAY (JI). Qualitative aspects of pear flavour. *J. Food Sci.* 46(4); 1981; 1152-8

SUGAR, STARCH AND CONFECTIONERY

2263 VOSS (Von P). The C-NMR spectroscopy as a method for structure studies in carbohydrate chemistry. *Starch*. 31(12); 1979; 404-9

2264 JELLICOE (L). Sugar - the bitter pill. *Food Manuf.* 56(3); 1981; 49

2265 ROUSHDI (M), GHALI (Y), ATTIA (RM) and ALAA EL-DIN (M). Studies on the combined action of amylases and glucose isomerase on starch and its hydrolysates. Part III. Conversion of starch to glucose-fructose syrup. *Starch*. 31(12); 1979; 414-7

Glucose syrup was produced by liquefaction of starch using acid, acid enzyme, one step enzyme and two steps enzyme process, followed by saccharification by free and immobilized glucoamylase. The effect of D-glucose concentration and temperature on conversion of glucose syrup by glucose isomerase was studied. 50% glucose concentration and a temperature range of 65-75 C gave the maximum conversion value. The isomerization was investigated as a pilot plant process. The relative sweetness of glucose-fructose syrup was calculated. It was found that the syrup with fructose content of 26% has the same sweetness as sucrose. AA

2266 RICHTER (G) and HEINECKER (H). Conversion of glucose into gluconic acid by means of immobilized glucose oxidase. *Starch*. 31(12); 1979; 418-22

2267 TEGGE (Von G). Enrichment and production of fructose from iso-syrup or invert sugar. *Starch*. 31(12); 1979; 409-13 (German)

Three principal methods for the enrichment of fructose have been described. They are 1) separation; 2) complex formation of fructose with boric acid; and (3) conversion, in which glucose is oxidised to gluconic acid. VR

2268 SMITH (DS), MANNHEIM (CH) and GILBERT (SG). Water sorption isotherms of sucrose and glucose by inverse gas chromatography. *J. Food Sci.* 46(4); 1981; 1051-3

A novel gas chromatographic procedure was used to obtain the water sorption isotherms of sucrose and glucose. The method allows calculation of partial pressure of water and water uptake directly from a chromatogram. The isotherms developed are in a water activity range well below that of conventionally developed isotherms. AA

STARCH

2269 KEMPF (Von W). Dynamic development of starch research and starch industry in Japan. *Starch.* 31(12); 1979; 397-404 (German)

2270 ADAM (S), BLANKENHORN (R) and DIEHL (JF). Effect of water activity upon electron-radiolysis of dextran. *Starch.* 31(12); 1979; 423-8

CONFECTIONERY

2271 MEIER (E). Mouthwatering proposition : Extruded sweet snacks. *Food Eng. Int.* 6(4); 1981; 31-3

2272 FOX (H). Package design changes : A new image. *Confect. Prod.* 47(5); 1981; 253, 252

2273 DAY (FT). Flexible packaging in the sugar confectionery trades. *Confect. Prod.* 47(5); 1981; 259-60

GUM

2274 SWEETMAKER. Wine gums and true gums. *Confect. Prod.* 47(5); 1981; 257-8

CANDY

2275 WISKER (E), KONIG (R) and FELDHEIM (W). A method for the determination of tartrazine in candies and pudding mixes. *Z. Lebensmittel-Unters. Forsch.* 170(4); 1980; 267-71 (German)

A quantitative method for the determination of tartrazine (E 102) is described employing the steps; extraction of the dyestuffs from the samples, chromatography on silicagel plates and automatically recorded densitometry. In candies, amounts of upto 285 mg tartrazine/kg and in pudding mixes upto 1223 mg tartrazine/kg were found. AA

CHOCOLATE

2276 HURST (WJ) and TOOMEY (PB). High-performance liquid chromatographic determination of four biogenic amines in chocolate. *Analyst.* 106(1261); 1981; 394-402

Some biogenic amines occur in a wide variety of foods including cheese, fish, bakery products and chocolate. This study was undertaken to analyse and quantify four of the biogenic amines thought to occur in chocolate. Tyramine, tryptamine, 2-phenylethylamine and serotonin (5-hydroxytryptamine) were chosen as the amines of interest. Two high-performance liquid chromatographic (HPLC) systems were used for the final analysis of amine extracts. Both systems employed dual detection, with the first using ultraviolet absorbance at 254 nm and the formation of a post-column o-phthaldehyde derivative. The second method used ultraviolet absorbance at 254 nm and the natural fluorescence of the four amines. Thin-layer chromatography (TLC) was performed on all of the extracts to

provide further confirmation. All four amines were detected and quantified at varying levels in extracts of several kinds of chocolate and chocolate liquors. AA

BAKERY PRODUCTS

2277 HILDEN BRAND (K). Contributing to the discussion pertaining to further developments of the BLL-guidelines for fine baked goods. *Getreide-Mehl. Brot.* 35(2); 1981; 54-6 (German)

Suggestions have been given for further development of BLL guidelines for fine baked goods. The definition of terms for fine baked goods; general evaluation characteristics, and minimum quantity specifications and evaluation characteristics for the individual products like biscuit, butter cakes, fruit bread, etc. have been discussed. VR

2278 SEILER (K). Raw materials and extrusion - Behaviour of cereal based raw materials during the extrusion process. Part 1. *Gordian.* 80(9); 1980; 210-13 (German)

The physicochemical changes of cereal ingredients during the extrusion process have been reported. The three important types of extrusion viz: cold deforming, gelatinization and cooking under high pressure have been discussed. VR

2279 SPICHER (G). Factors influencing the growth of moulds and methods for mould prevention of baked products. (Symposium on "Fresh-keeping and Microbial Spoilage of Baked Products). *Getreide-Mehl. Brot.* 34(5); 1980; 128-37 (German)

The author has discussed a "strategy for overcoming mould contamination". As one can hardly expect any new methods of physical and chemical methods of preservation of food in the near future, there is a great need to fill in the gaps regarding the application of known techniques - such as control of storage temperature and equilibrium moisture, use of preservatives, acidification of baked products, use of CO_2 gas - for overcoming mould contamination of bread and baked products. Attention must also be directed towards the optimal treatment of baked products in the selling chain, and by the consumer. KMD

2280 GUCKENBERGER (JD). Bakery icings. *Baker's Dig.* 55(1); 1981; 12-6

Types of icings, quality of icing, ingredients used in icing preparations, types of stabilizer gums, functions of a stabilizer and the ingredients and formulations of icings are the topics covered in this article. KAR

2281 ARNOLD (M). In search of the snack. *Food Flavour. Ingred. Packag. Process.* 3(1); 1981; 29-31

BREAD

2282 SEIBEL (W), MENGER (A) and BRUMMER (J-M). Results of the 22nd quality test and evaluation of wheat breads and other baked goods. *Getriede-Mehl. Brot.* 35(2); 1981; 48-51 (German)

2283 MENGER (A). BLL-guidelines for 'fine baked goods' - introductory remarks to a contribution of the GDch - working group "Bread and other Baked Goods". *Getreide-Mehl. Brot.* 35(2); 1981; 52 (German)

The BLL (Food Law and Food Science Association) guidelines cover the most important types of fine baked goods and are viewed as supplement to the guiding principles for baked goods. The suggestions of the GDch working group "Bread and other Baked Goods" to the DLG quality control tests have been mentioned. VR

2284 BOTTGER (D) and SCHMID (A). Fermentation stop and controlled fermentation for wheat bread and wheat mixed bread. *Getreide-Mehl. Brot.* 35(2); 1981; 40-6 (German)

The following important factors are to be considered for a successful controlled fermentation to obtain baked goods of high quality. a) Careful selection of raw material - intensive kneading and quick processing of dough; b) correct selection of suitable ferment carriers during storage and baking process; c) perfect devices and during controlled fermentation high freezing rate, in the case of turbulent and humid atmosphere. VR

2285 HARTMANN (G). Packaging of bread and rolls with plastic films. (Symposium on "Fresh-keeping and Microbial Spoilage of Baked Products"). *Getreide-Mehl. Brot.* 34(5); 1980; 137-40 (German)

Cellophane, polyethylene, polypropylene, PVC, shrink and combination films are used as packing materials for bread and rolls. Bread is comparatively moist, and that is why the degree of water-vapour permeability is very important. Hard-baked rolls require a higher water-vapour permeability, while sliced bread requires a water-vapour impermeable packaging. Still higher requirements on packaging material can be satisfied only by using combination films (or laminates). KMD

2286 SHOGREN (MD), POMERANZ (Y) and FINNEY (KF). Counteracting the deleterious effects of fiber in breadmaking. *Cereal Chem.* 58(2); 1981; 142-4

Blends of wheat flour and wheat, corn, or soyabean bran or coconut residue were baked into bread. The deleterious erfects of up to 15 parts of wheat bran per 85 parts of wheat flour could be largely counteracted with the addition of vital gluten and one of several surfactants alone or in combination with shortening. Surfactants included diacetyl tartaric acid esters (DAT), ethoxylated monoglycerides (EMG), lecithin, sucrose monopalmitate (SMP), and sodium stearoyl-2-lactylate, In the absence of shortening, 1 g each of DAT, EMG, or SMP per 100 g of mixture materially increased loaf volume beyond the level produced by 3 g of shortening. In the presence of 3 g of shortening per 100 g of mixture, adding 0.5 g DAT. EMG, lecithin, SMP, or sodium stearoyl-2-lactylate produced only small improvements above the levels produced when shortening alone was added. AA

2287 LORENZ (K). Sourdough processes - Methodology and biochemistry. *Baker's Dig.* 55(1); 1981; 32-6

Aspects covered include, sourdough preparation, through multiple, two- and one-stage factors affecting sourdough including flour type, starter propagation, absorption rate, atmospheric oxygen and pH: bacteria and yeasts in sourdough and extent of faults in bread which is traceable to sourdough. KAR

2288 SATHE (SK), PONTE (JG) Jr., RANGNEKAR (PD) and SALUNKHE (DK). Effects of addition of great northern bean flour and protein concentrates on rheological properties of dough and baking quality of bread. *Cereal Chem.* 58(2); 1981; 97-100

Addition of bean flour at or above 10% levels caused detrimental effects on dough and bread quality. Protein concentrates ($\lesssim$10%) rendered prepared breads to become better acceptable than those prepared with mung bean flour ($\lesssim$ 10%). BSN

2289 CARLSON (BL), KNORR (D) and WATKINS (TR). Influence of tomato seed addition on the quality of wheat flour breads. *J. Food Sci.* 46(4); 1981; 1029-31, 1042

2290 ZADOW (JG) and HARDHAM (JF). Studies on the use of whey protein concentrates in bread. *Aust. J. Dairy Technol.* 36(2); 1981; 60-63

Simulated whey protein concentrates (SWPC) were prepared by dialysis and freeze-drying from rennet casein whey, HCl casein whey, lactic casein whey, Cheddar cheese whey, milk serum and skim milk. Addition of (SWPC) bread doughs resulted in substantial depression of loaf height. Similarly, SWPC prepared from fractions taken at different stages during the normal manufacture of whey protein concentrates (WPC) all resulted in depressed loaf height. The depression of loaf height as a result of SWPC addition was not a function of the type of whey used nor of manufacturing techniques. Fractionation of WPC by centrifugal techniques or by gel filtration did not result in improved baking characteristics. The incorporation of WPC into bread did not affect the rate of yeast fermentation. AA

2291 NIMAN (CE). Salt in bakery products. *Cereal Food World.* 26(3); 1981; 116-8

Article covers the function of salt in bread; types of salt used by bakers, functional properties of salt, and use of salt in other bakery products. KAR

2292 OCKER (HD) and SEIBEL (W). Residue problems with grain and bread. 2. Heavy metal contents (lead, cadmium). *Getreide-Mehl. Brot.* 34(5); 1980; 118-23 (German)

1200 samples of German wheat and rye were examined over a 4-year period. The Pb content of wheat remained constant at 0.05 ppm over the period, while the Cd-content increased from 0.05 to 0.06 ppm. The Pb content in rye increased from 0.08 to 0.11 ppm, while the Cd-content remained constant at 0.012 ppm. There were, however, wide variations in the heavy metal contents of individual samples: 0.01 to 0.85 ppm for Pb, and >0.1 ppm for Cd. Tests on 180 representative samples of bread showed average lead contents of 0.021 to 0.059 ppm, and average Cd contents of 0.011 to 0.037 ppm. The range of variation was much narrower than in the grain samples. Wheat bread had significantly less of Pb, and distinctly more of Cd than rye bread. Still higher Cd-contents were found in linseed bread and wheat germ bread. Traces of heavy metals found in bread originate from the cereal raw material and not from other additives used in baking. Processing of cereals for bread manufacture results in some decontamination (loss) of the heavy metals. Thus, the average Cd-intake through wheat and rye products works out to 0.039 mg Cd per head per week, which is only 7.4% of the tolerable weekly dose specified by WHO. KMD

2293 BECKER (HG) and ZENTGRAF (H). Evaluation of bread in the nutrition report 1980. *Getreide-Mehl. Brot.* 35(2); 1981; 46-7 (German)

A positive evaluation of bread is attempted in Nutrition Report for 1980. Some of the arguments supporting the increase in bread consumption are i) the carbohydrate portion in the energy supply of an average diet is too low, whereas that of fat is too high; 2) a further increase in the consumption of animal protein is not advisable; and 3) bread has important and necessary nutrients. However, sodium and phosphorus are present in high amounts in bread. VR

CAKE

2294 CLEMENTS (RL) and DONELSON (JR). Note on a simple device for monitoring batter expansion in layer cakes during baking. *Cereal Chem.* 58(2); 1981; 153-4

2295 JOHNSON (TM) and ZABIK (ME). Response surface methodology for analysis of protein interactions in angel food cakes. *J. Food Sci.* 46(4); 1981; 1226-30

MILK AND DAIRY PRODUCTS

2296 GLUCK (U) and THIER (HP). Quantitative determination of some thickeners in dairy products. *Z. Lebensmittel-Unters. Forsch.* 170(4); 1980; 272-9 (German)

An analytical method is described, by which nine polysacchrides used as thickeners for dairy products (locust bean gum, guar, gum arabic, tragacanth, arabinogalactan, carrageenan, furcellaran, agar, xanthan) can be identified in foods relatively rapidly and at the same time determined quantitatively. In this procedure interfering substances like fat, starch, proteins, sugars and salts are removed; the isolated polysaccharides are hydrolysed by trifluoroacetic acid and the monosaccharides resulting are measured by GLC as aldonitrileacetates. The quantitative evaluation of the gas chromatograms is made by means of an internal standard and the content of thickener in the sample is calculated from one of the sugars. Recoveries of 80-90% with relative standard deviations of 5-10% were obtained when adding 0.05% of the thickeners to skim milk or 1-2% to mixtures of icecream or pudding constituents. AA

MILK

2297 SANKHLA (AK) and YADAVA (RK). A comparison of unsaponifiable matter and physico-chemical constant of milk fat from various species. *Indian J. Dairy Sci.* 34(3); 1981; 327-30

2298 MATHUR (ON) and ROY (NK). Studies on trace minerals in buffaloes' milk. Part 2. Boron. *Indian J. Dairy Sci.* 34(3); 1981; 321-6

2299 ARUMUGHAN (C) and NARAYANAN (KM). Triacylglycerol composition of cow milk fat. *J. Food Sci. Technol.* (India) 19(2); 1982; 71-4
The triacylglycerols (TG) of cow milk fat were separated first into high molecular weight TGs (HMT), medium molecular weight TGs (MMT), and low molecular weight TGs (LMT). These were further resolved into saturated *trans* monoene, diene and polyene TGs using argentation thin layer chromatography (TLC). The HMT contained mostly the long chain fatty acids, whereas most of the short chain acids of the milk fat were concentrated in LMT. AA

2300 RAMASWAMY (V), NATARAJAN (AM) and NAMBUDRIPAD (VKN). Variations in acetyl methylcarbinol (AMC) and diacetyl production by lactic cultures in skim milk on continued propagation in different media. *Indian J. Microbiol.* 21(2); 1981; 160-62

2301 CHURCH (FC), CATIGNANI (GL) and SWAISGOOD (HE). Hydrolysis of milk proteins by immobilized *Streptomyces griseus pronase*. *J. Dairy Sci.* 64(5); 1981; 724-31

2302 KOSCHAK (MS), FENNEMA (O), AMUNDSON (CH) and LEE (JY). Protein stability of frozen milk as influenced by storage temperature and ultrafiltration. *J. Food Sci.* 46(4); 1981; 1211-7
Samples of frozen milk and milk concentrates (12-35% total solids) stored at -4 to -12 C showed poorer protein stability than those stored at higher or lower temperatures. Ultrafiltered (UF) skim milk (permeate: retentate ratios of 10:90, 20:80 and 30:70) remained stable at -8 C, at least 3 times longer than frozen control samples of UF skim milk stored at the same temperature. Protein stability declined somewhat when the extent of UF was increased to 40:60. MVG

2303 SINGH (K) and SINHA (RN). Rapid detection of coliforms in pasteurized milk. *Indian J. Dairy Sci.* 34(3); 1981; 305-9

2304 SARKER (AB) and PAL (RN). Effect of skipping milking once or twice weekly on production, composition of milk and udder health of Murrah buffaloes. *Indian J. Dairy Sci.* 34(3); 1981; 261-5

2305 HUGHES (D) and JENSEN (N). *Yersinia enterocolitica* in raw goat's milk. *Appl. Environ. Microbiol.* 41(1); 1981; 309-10

CURD/DAHI

2306 GANDHI (DN) and NAMBUDRIPAD (VKN). Isolation and characterization of antibiotic producing *Lactobacillus acidophilus* culture from dahi (curd). *Indian J. Dairy Sci.* 34(3); 1981; 334-6

CHHANA

2307 MOORTHY (PRS) and RAO (BVR). Studies on production and quality of chhana from goat milk. *J. Food Sci. Technol.* (India) 19(2); 1982; 69-71
Chhana prepared from goat milk of 3, 4 and 5% fat using lactic acid, sour whey and citric acid as coagulants was compared with Chhana made from cow milk of 4% fat. The Chhana was tested for moisture content, fat

losses in whey, organoleptic quality and yield. Rasagolla (a sweet meat) made from Chhana was also tested for its quality. The production cost was worked out. The results indicate that goat milk with 5% fat and with citric acid as coagulant resulted in higher yields, but milk with 3% fat gave Chhana with higher moisture content. Fat losses in whey are minimum when lactic acid is used as coagulant and when milk fat was 3%. Better quality Rasagolla was obtained from Chhana made from 4% fat using lactic acid as coagulant. The cost of production of Chhana suitable for Rasagolla making is minimum when goat milk of 4% fat was used. AA

KHOA

2308 ARORA (JR) and BINDAL (MP). Lipids of khoa at various stages during its preparation from cow and buffalo milk. *Indian J. Dairy Sci.* 34(3); 1981; 315-20

2309 VARADARAJ (MC) and NAMBUDRIPAD (VKN). Staphylococcal incidence in market khoa and their enterotoxins production. *J. Food Sci. Technol.* (India) 19(2); 1982; 53-7

The average staphylococcal counts of 100 market khoa (a heat concentrated Indian milk product) samples collected from cities of Bangalore and Mysore (India) were 400 x 10^6 and 360 x 10^6 colony forming units (CFU)/g respectively. Preformed, thermostable deoxyribonuclease (TDNase) was detected in 24 of these samples. The isolates were characterised for pigmentation, mannitol fermentation and production of acetoin, ammonia, phosphatase, coagulase and TDNase and nitrate reduction. Among the 300 isolates, 125 were identified as *Staphylococcus aureus* Only 64 isolates produced staphylococcal enterotoxins (SE)-SEA, SEB, SEC, SED and SEE, either singly or in combinations. All the enterotoxigenic isolates were strains of S. *aureus*. AA

BUTTER

2310 SREEBHASHYAM (SK), GUPTA (SK) and PATEL (AA). A comparative study of buffalo and cow butterfat fractions. *Indian J. Dairy Sci.* 34(3); 1981; 310-14

WHEY

2311 KIM (MN), SALTMARCH (M) and LABUZA (TP). Non-enzymatic browning of hygroscopic whey powders in open versus sealed pouches. *J. Food Process. Preserv.* 5(1); 1981; 49-57

The moisture sorption behaviour and non-enzymatic browning of hygroscopic whey powders stored in open and sealed conditions were examined. The water released from crystallization of the amorphous lactose in the whey powders was entrapped within sealed pouches, resulting in an increased local moisture content as well as a_w for products initially humidified in the 0.33 to 0.44 range before packaging. Thus, the rate of non-enzymatic browning reaction during storage at 35C was greatly increased in the sealed samples compared to samples stored open to the environment. Infact, at 0.33 a_w, a maximum was observed for the sealed storage samples, while a minimum was shown in the open stored samples. Because of this, precautions

should be taken in using the results of storage studies of open systems to predict kinetics of deteriorative reactions during shelf-life tests of sealed food systems, especially if amorphous to crystalline change can occur. AA

CHEESE

2312 RANGANADHAM (M) and RAO (BVR). Studies on production and quality of Queso Blanco cheese. *J. Food Sci. Technol.* (India) 19(2); 1982; 66-8

Preparation of Queso Blanco cheese from buffalo milk of 5% fat and cow milk of 3.5% fat using citric acid as a coagulant and addition of 2% salt, and 10 and 20% cane sugar is described. The shelf life was assessed by storing at 6-8 C for 6 days. Addition to 2% salt resulted in higher yield when milk solids are more in milk and moisture retention was more in the case of Queso Blanco cheese made from cow milk. Further, addition of 2% salt resulted in higher fat percentage in cheese from buffalo milk and low yeast and mould count. Addition of cane sugar at both levels resulted in more loss of fat in the whey, and higher yeast and mould count; but the cheese was more acceptable when made from buffalo milk with addition of 10% cane sugar. AA

2313 ALICHANIDIS (E), POLYCHRONIADOU (A), TZANETAKIS (N) and VAFOPOULOU (A). Teleme cheese from deep-frozen curd. *J. Dairy Sci.* 64(5); 1981; 732-39

Teleme cheese prepared from curd (mixture of 90% cow milk and 10% goat milk) frozen and stored at -20 C for 1,2 and 6 months showed more extensive proteolysis and accelerated ripening than control, depending upon the duration of deep frozen storage. No flavour defects were observed; however, crumbliness in the interior of cheese was noticed and as such the texture was inferior to control samples. BSN

MEAT AND POULTRY

2314 ANON. Fifty years of meat conditioning. *Food Manuf.* 56(3); 1981; 37-9

2315 BOUTON (PE), HARRIS (PV) and RATCLIFF (D). Effect of cooking temperature and time on the shear properties of meat. *J. Food Sci.* 46(4); 1981; 1082-7

2316 THEILER (RF), SATO (K), ASPELUND (TG) and MILLER (AF). Model system studies on N-nitrosamine formation in cured meats: Effects of curing solution ingredients. *J. Food Sci.* 46(4); 1981; 996-98

Of the commonly used curing solutions, sodium erythorbate and sodium ascorbate were equally effective in reducing nitrosopyrrolidine levels. Nitrosamine formation was not affected by addition of sodium tripolyphosphate or sucrose. Sodium chloride, however, exhibited a concentration dependent inhibition of nitrosopyrrolidine formation. In samples containing no added sodium chloride, nitrosopyrrolidine levels were 50% higher than those with 1.5% added salt. MVG

2317 JAUREGUI (CA), REGENSTEIN (JM) and BAKER (RC). A simple centrifugal method for measuring expressible moisture, a water-binding property of muscle foods. *J. Food Sci.* 46(4); 1981; 1271, 1273

2318 KEMP (JD), LONGLOIS (BE) and FOX (JD). Effects of vacuum packaging and potassium sorbate on yield, yeast and mold growth, and quality of dry-cured hams. *J. Food Sci.* 46(4); 1981; 1015-7, 1024

Of the two trials conducted, the first used hams cured by a standard process, aged one month at 24 C and unpackaged (Group I); vacuum packaged (Group II); and dipped in 2.5% potassium sorbate and vacuum packaged (Group III). The samples were examined after one month and dipped in 5% potassium sorbate solution, vacuum packaged and further aged for 2 months. It was found that vacuum packaging eliminated further weight loss. The potassium sorbate reduced, but did not eliminate mold growth. In the second trial, hams were cured and aged similarly till there were officially country hams (18%) and the Group I were untreated while Group II were dipped in 10% potassium sorbate solution. Both the groups were vacuum packaged. On examination after one month ageing, it was found that no significant loss had occured but the mold counts were lower in the dipped group. The dipping procedure was then reversed between the groups, and the hams were vacuum packaged and aged for one more month. Mold growth was minimal and there was no additional weight loss. All the sensory attributes were similar and highly acceptable. In general, the study revealed that potassium sorbate can reduce , though not fully eliminate mold growth and that vacuum packaging can control the weight loss. MVG

2319 WIBERG (C) and NILSSON (G). Redox potential (Eh) in fresh NaCl-salted and nitrite-salted ham. *Var Foda.* 32(3); 1980, 139-43

2320 ANDERSON (PJ). Actin determination as a means of calculating the meat content of meat products. *J. Food Sci.* 46(4); 1981; 1111-3

2321 DENG (JC), TOLEDO (RT) and LILLARD (DA). Protein-protein interaction and fat and water binding in comminuted flesh products. *J. Food Sci.* 46(4); 1981; 1117-21

2322 AKERSTRAND (K) and NORBERG (P). Too long storage-time for vacuum-packed, sliced meat. *Var Foda.* 32(8); 1980; 402-8 (Swedish)

The storage life of vacuum-packed sliced meat in Sweden is often given on the label as 2-5 weeks. Hence samples stored at 7-8 C till the last day of their specified shelf-life were examined microbiologically. No pathogenic bacteria were found; but the total count did exceed the nationally imposed limit of 10^8 in 45% of the samples. 7% of the samples contained $>10^3$ coliform bacteria, and 12% > 10^5 enterococci. The proposed limit of 10^4 yeast cell per g was surpassed in 18% of the samples. Thus, the storage life mentioned on the label is rather too long. KMD

2323 OCKERMAN (HW), PLIMPTON (RF) Jr. and PATTERSON (RLS). Influence of castration and diethylstiloestrol implantation of boars on carcass characteristics, sensory panel evaluation and 5 α-androst-16-en-3-one levels. *J. Food Sci.* 46(4); 1981; 1144-6, 1161

2324 SEGARS (RA), GARDELLO (AV) and COHEN (JS). Objective and subjective texture evaluation of irradiation sterilized meat products. *J. Food Sci.* 46(4); 1981; 999-1003

Instrumental measures of textural properties and texture panel evaluations were obtained on several meat products irradiated using various dose-temperature conditions. Both the panel results and the instrumental data revealed several irradiation treatments that produced a tougher meat

than the non irradiated controls. Further studies indicated that this toughening was due to a freezing irradiation interaction. AA

2325 CHEN (MT), OCKERMAN (HW), CAHILL (VR), PLIMPTON (RF) Jr. and PARRETT (NA). Solubility of muscle proteins as a result of autolysis and microbiological growth. *J. Food Sci.* 46(4); 1981; 1139-43, 1158

2326 EUSTACE (IJ). Control of bacterial contamination of meat during processing. *Food Technol. Aust.* 33(1); 1981; 28-32
The sources of contamination of meat and the control measures are discussed mainly with respect to processing. KAR

2327 GILL (CO), PENNEY (N) and WAUTERS (AM). Survival of clostridial spores in animal tissues. *Appl. Environ. Microbiol.* 41(1); 1981; 90-2

2328 KOMATSU (KK) and RESTAINO (L). Determination of the effectiveness of novobiocin added to two agar plating media for the isolation of *Salmonella* from fresh meat products. *J. Food Safety.* 3(3); 1981; 183-92
Five plating media, Hektoen enteric (HE) and xylose lysine deoxycholate (XLD) agars with and without 80 and 5 µg/ml of novobiocin (N), respectively, and brilliant green sulphadiazine (BGS) agar with 80 µg/ml of the antimicrobial agent, were analyzed for the recovery of salmonellae from various fresh beef, pork, and poultry meat products. Of the total *Salmonella* positive samples, 50.0% and 82.5% were found on XLD and XLD-N agars, respectively, 75.0% and 85.0% on HE and HE-N agars, respectively and 65.0%, on BGS agar. HE-N and BGS media isolated three times more false positives than did XLD-N agar, while XLD and HE agars gave the highest numbers of false positives. The major H_2S producing false positive on XLD and HE agars was *Proteus mirabilis*. With the addition of N, *P. mirabilis* was eliminated, and the major H_2S producing false positive was almost exclusively *Citrobacter freundii*. The false positives on BGS agar were predominantly distributed among *C. freundii*, *Enterobacter* sp., and *Klebsiella* sp. AA

2329 BITTEL (RJ) and GRAHAM (PP). The use of mechanically separated spleen in meat patties. *J. Food Sci.* 46(4); 1981; 1272-3

BEEF

2330 McCURDY (SM), HARD (MM) and MARTIN (EL). Proximate analysis of cooked chuck and round roasts from two beef breed-types on two feeding regimes. *J. Food Sci.* 46(4); 1981; 1282-3

2331 McCURDY (SM), HARD (MM) and MARTIN (EL). Sensory properties of rib and round muscle roasts from two beef-bread-types on two feeding regimes. *J. Food Sci.* 46(4); 1981; 991-5, 998

2332 CARROLL (RJ), CAVANAUGH (JR) and RORER (FP). Effects of frozen storage on the ultrastructure of bovine muscle. *J. Food Sci.* 46(4); 1981; 1091-4, 1102

2333 WU (JJ), DUTSON (TR) and CARPENTER (ZL). Effect of postmortem time and temperature on the release of lysosomal enzymes and their possible effect on bovine connective tissue components of muscle. *J. Food Sci.* 46(4); 1981; 1132-5

2334 SALM (CP), MILLS (EW), REEVES (ES), JUDGE (MD) and ABERLE (ED). Effect of electrical stimulation on muscle characteristics of beef cattle fed a high energy diet for varying lengths of time. *J. Food Sci.* 46(4); 1981; 1284-5, 1287

2335 ARASU (P), FIELD (RA), KRUGGEL (WG) and MILLER (GJ). Nucleic acid content of bovine bone marrow, muscle and mechanically deboned beef. *J. Food Sci.* 46(4); 1981; 1114-6

2336 HAND (LW), CRENWELGE (CH) and TERRELL (RN). Effects of wheat gluten, soy isolate and flavourings on properties of restructured beef steaks. *J. Food Sci.* 46(4); 1981; 1004-6

2337 GRIFFIN (CL), STIFFLER (DM), RAY (EE) and BERRY (BW). Effects of electrical stimulation, boning time, and cooking method of beef roasts. *J. Food Sci.* 46(4); 1981; 987-90

Electrical stimulation resulted in longer ($P < 0.01$) sarcomeres for cooked product (Biceps femoris muscle) but had no effects on palatability traits, cooking loss or chemical content. Hot boning reduced ($P < 0.01$) cooking loss and tenderness, resulted in less ($P < 0.05$) total, soluble and insoluble collagen and increased the juiciness score and moisture percentage as compared with 48 hours boning. Microwave cooking gave a greater ($P < 0.01$) cooking loss and higher shear force value than conventional electrical cooking. MVG

2338 EISELE (TA) and BREKKE (CJ). Chemical modification and functional properties of acylated beef heart myofibrillar proteins. *J. Food Sci.* 46(4); 1981; 1095-102

2339 BERRY (BW) and STIFFLER (DM). Effects of electrical stimulation, boning temperature, formulation and rate of freezing on sensory, cooking, chemical, and physical properties of ground beef patties. *J. Food Sci.* 46(4); 1981; 1103-6

2340 ABUGROUN (HA), ABERLE (ED), DOCKERTY (TR), MARKS (JS) and JUDGE (MD). Evaluation of prerigor freeze-dried beef in the manufacture of dry fermented sausage. *J. Food Sci.* 46(4); 1981; 1280-81

2341 HARRISON (MA), MELTON (CC) and DRAUGHON (FA). Bacterial flora of ground beef and soy extended beef during storage. *J. Food Sci.* 46(4); 1981; 1088-90

2342 NOTERMANS (S), DUFRENNE (J) and OOSTEROM (J). Persistence of *Clostridium botulinum* type B on a cattle farm after an outbreak of botulism. *Appl. Environ. Microbiol.* 41(1); 1981; 179-83

2343 KONDAIAN (N), LAKSHMANAN (V), KESAVA RAO (V) and SHARMA (N). Studies on type and conformation of slaughter buffaloes and carcasses in India. *Indian J. Anim. Sci.* 15(2); 1981; 107-11

Type and conformation of buffaloes slaughtered at different slaughter houses in India and their carcass characteristics were studied. The predominence of breeds was based on their habitat. On an average, 55% and 45% of the buffaloes slaughtered were females and males respectively, though the sex ratio varied much between slaughter houses. The overall

conformation of buffaloes were from poor to fair though there was scope for improvement. Females were better than males in conformation and were also fattier. There was significant correlation between eye muscle colour and conformation. The North Indian breeds yielded darker meat than those from the South. The colour scores of the muscles were higher in males than in females. MVG

LAMB

2344 BASUTHAKUR (AK), SINGH (RN) and NIVSARKAR (AE). Study on some pre- and post-slaughter parameters in Malpura lambs. II. Major cuts and their relations. *Indian Vet. J.* 58(9); 1981; 713-20

PORK

2345 SPINELLI-GUGGER (AM), LAKRITZ (L), WASSERMAN (AE) and GATES (R). Nitrosamine precursors in the adipose tissue of pork bellies. *J. Food Sci.* 46(4); 1981; 1136-8, 1151

In this study of primary site of nitrosopyrrolidine (NPYR) production in fried bacon pork, belly adipose tissue was extracted with $CHCl_3$/MeOH which yielded an organic layer, an aqueous polar fraction and a tissue residue. When the fractions were heated with sodium nitrite, the polar fraction accounted for most of the nitrosamines intact adipose tissue. MVG

2346 VIJAYAKHADER. The acceptability and estimation of riboflavin content of six standard recipes from each of five retail cuts of pork. *Indian J. Nutr. Dietet.* 17(11); 1980; 418-23

Different cuts of pork ((i) belly blade, (ii) Longissimus dorsi (L.D.), (iii) Semimembranosus adductor (S.M.) and (iv) Shank were used for preparing indigenous preparations like (a) pork masala (b) braised pork (c) pork curry and (d) pork chops braised (e) keema matar, (f) pork vindaloo using prescribed recipes and their acceptability and riboflavin contents were assessed. Results showed that attractive and acceptable preparations may be made from (i)-(iv) and one serving (about 60 g) of the raw pork cut meets only 1/13 to 1/9 of daily dietary requirements of riboflavin; cooked preparations provide only 1/6 to 1/4 of the daily requirements. BSN

2347 CROSS (HR), MOSS (MK), ONO (K), TENNENT (I), SLOVER (HT), WOLF (W), THOMPSON (R), LANZA (E), and STEWART (K). Sampling of fresh pork for nutrient analysis. *J. Food Sci.* 46(4); 1981; 1007-9

It was observed that pork loins subjected to extreme marketing conditions had similar weights, appearance, quality traits and nutritional composition as loins shipped from a slaughter house directly to research facility. MVG

2348 STERN (NJ). Recovery rate of *Campylobacter fetus* ssp. *jejuni* on eviscerated pork, lamb, and beef carcasses. *J. Food Sci.* 46(4); 1981; 1291-1293

Unwashed carcasses of swine (58), sheep (59), and beef (58) were assessed for the incidence of *Campylobacter fetus* spp. *jejuni*. The potential pathogen was present on 38% of the swine, 24% of the sheep, and 2% of the beef carcasses examined. This study serves to point out the association of the pathogen within food marketing channels. AA

CHICKEN

2349 HALL (PS) and EAMES (AE). The determination of extraneous water in frozen chickens. *J. Assoc. Public Anal.* 19(Pt 2); 1981; 65-70

Comparative determinations of extraneous water in frozen chickens by different methods of analysis are reported and critically examined. It is shown that the prescribed EEC methods are of little value for enforcement purposes. Of the official methods the Annex III procedure is shown to give the most consistent results, but the calculation is shown to be too generous, since it permits a substantial amount of extraneous water to be undetected. The Stubbs and More procedure is reliable and has some advantage. AA

2350 SUDERMAN (DR), WIKER (J) and CUNNINGHAM (FE). Factors affecting adhesion of coating to poultry skin: Effects of various protein and gum sources in the coating composition. *J. Food Sci.* 46(4); 1981; 1010-11

Poor adhesion resulting in breading losses is a major problem with battered and breaded food products. In this study, the effects of protein and gum sources and their amounts on the adhesion of a commercial breading mix to poultry mix have been studied. Whey, soy, nonfat dry milk, egg albumen, and gelatin were the protein sources; sodium carboxymethyl cellulose (CMC), guar, tragacanth and xanthane were the gum sources. Gelatin and egg albumen, among the proteins effectively improved adhesion, and among the gums, only CMC was significantly better in improving adhesion. Increased levels of these in the breading mix did not have any significant effect on adhesion. MVG

2351 MORENO (B) and CALLES (A). Benzathine penicillin G residues in chicken tissues, after feeding of diets containing this antibiotic. *matol.* 32(1); 1980; 22-32 (Spanish)

The authors have measured the residues of benzathine penicillin G in the muscle, liver, and kidneys of chickens fed for 21 days on diets containing 500, 100, 50 and 10 ppm of this antibiotic. The antibiotic remains longest in the kidneys. The potential risks of adding penicillin to animal feeds (bacterial resistance and allergic reactions) have been discussed. It is unlikely that any such resistance or reactions would be met in human beings who eat these chickens, but those who handle the live birds may get contaminated with resistant strains of staphylococci. KMD

2352 HAMM (D). Amino acid composition of breast and thigh meat from broilers produced in four locations of the United States. *J. Food Sci.* 46(4); 1981; 1122-4

The amounts (% protein basis) of valine, leucine, isoleucine and histidine were significantly higher ($P \leq 0.01$) in breast meat, while glycine, hydroxyproline, hydroxylysine, threonine, and serine were higher in thigh meat. The concentrations of about half of the amino acids present appeared to have been influenced by area of production and/or related management practices. Hydroxyproline was more in male broilers than in females. MVG

2353 HALL (KN) and LIN (CS). Effect of cooking rates in electric or microwave oven on cooking losses and retention of thiamin in broilers. *J. Food Sci.* 46(4); 1981; 1292-3

Thiamin retention was more in broilers cooked in microwave oven than in those cooked in an electric oven. No differences in thiamin retention were found between broilers cooked in microwave oven at 800 and 1600 watts. Thiamin retention was more in broilers cooked in electric oven at 204 C than those cooked at 121 C. Broilers cooked at 1600 watts in microwave oven had the greatest weight loss. Broilers microwave cooked at 800 watts and oven cooked at 121 C or 204 C exhibited no differences in weight loss. MVG

2354 HOERR (FJ), CARLTON (WW) and YAGEN (B). The toxicity of T-2 toxin and diacetoxyscirpenol in combination for broiler chickens. *Food Cosmet. Toxicol.* 19(2); 1981; 185-8

The 72-hour, single oral dose LD_{50} for T-2 toxin was 4.0 mg/kg body weight, and for diacetoxyscirpenol, it was 5.0 mg/kg body weight. T-2 toxin, administered as 14 daily oral doses had an LD_{50} of 2.90 mg/kg, and diacetoxyscirpenol had an LD_{50} of 4.15 mg/kg. Combinations of the toxins caused additive lethal effects in both the single- and multiple-dose tests. These toxins are found in feedstuffs contaminated with *Fusarium* moulds. KMD

QUAIL

2355 CHOUDHARY (MK) and MAHADEVAN (TD). A note on the effect of different scalding times and temperatures on dressing of quails. *Indian Poult. Gaz.* 65(4); 1981; 154-5

8 week old quails were slaughtered as per standard procedure, and scalded at 120, 130, 137 and 140 F for 60,90 and 120 seconds at each temperature. Scalding at 137 F for 120 seconds removed the feather completely and the dressed quails possessed greatest eye appeal. KMD

2356 KONDAIAH (N), PANDA (B) and SINGHAL (RA). Internal quality units for quail eggs : A ready reckoner table. *Indian Poult. Gaz.* 65(4); 1981; 113-26

The ready reckoner table prepared for assessing the internal quality of quail eggs is based on the albumen height and egg weight. KMD

Egg

2357 MAHAPATRA (CM) and PANDEY (NK). Egg quality characteristics of slow and rapid feathering birds of Kadakanath breed. *Indian Poult. Gaz.* 65(4); 1981; 156-7

Eggs from rapid and slow feathering breeds did not differ significantly in quality. KMD

2358 KING (AJ), BALL (HR) and GARLICH (JD). A chemical and biological study of acylated egg white. *J. Food Sci.* 46(4); 1981; 1107-10

Egg white treated with acetic and succinic anhydride was evaluated chemically and biologically. Lyophilized albumen contained 4.9% moisture and 82.0-85.8% protein. Acetylation blocked 64 and 68% total and epsilon amino groups while succinylation blocked 52% total and 55% epsilon amino groups, respectively. The *in vitro* multienzyme technique for evaluating protein digestibility indicated that untreated and treated egg white were about 80% digestible. Weight gain of chicks fed acylated egg white

as the sole source of dietary protein was significantly less than that of chicks fed the control. Chick mortality observed during the bioassays was attributed to a sodium and chloride imbalance in the diets. AA

2359 DIXON (DK) and COTTERILL (OJ). Electrophoretic and chromatographic changes in egg yolk proteins due to heat. *J. Food Sci.* 46(4); 1981; 981-3, 990

Changes in the degree of heat damage in egg yolk products heat treated at 3 C intervals from 54 to 84 C for 3.5 minutes were examined by employing polyacrylamide gel electrophoresis and diethylaminoethyl-cellulose ion-exchange chromatography. Very little effect was observed on electrophoretograms by pasteurisation temperatures of 61.0 and 63.3 C for plain, 10% sugared and 10% salted egg yolk was observed with γ-livetins being slightly affected. These proteins were altered by higher temperatures until they dissappeared from the electrophoretograms from plain yolk ca 73° sugared yolk ca 76° and salted yolk ca 79° C. similar effect was also observed in lipovitellin fractions and phosvitins. Sugar and salt at 10% levels had a protective effect against heat allowing Ca 3 and 6 C higher temperatures respectively before heat damage occurred. Pasteurisation had very little effect on chromatograms from plain and sugared yolk. In unheated and pasteurised (63.3 C) salted yolk, however, major changes occurred. Chromatographic patterns for salted yolk pasteurised at 63.3 and 68.0 C were similar indicating thereby that this product can be pasteurised at 68.0 C. MVG

2360 CHEN (TC) and HSU (SY). Quality attributes of whole egg and albumen mixtures cooked by different methods. *J. Food Sci.* 46(4); 1981; 984-6

Mixtures of whole egg and albumen were (1) pan scrambled in double boiler; (2) pan scrambled in a Teflon coated skillet; (3) boiled-in-bag in boiling water; and (4) cooked in bag in a microwave oven, and their yields, weeping and volatile flavour components in the cooked products were measured. Yields for (3) and (4) were higher than (1) and (2). Yields of albumin product were lower than whole egg product regardless of cooking method. Products from (4) were also lower in weeping percentages. The major volatile components were very slightly affected by cooking. Whole egg prepared by (1) had less H_2S, NH_3 and total carboxyls than those prepared by other methods. MVG

2361 JOHNSON (TM) and ZABIK (ME). Egg albumen proteins interactions in an angel food cake system. *J. Food Sci.* 46(4); 1981; 1231-6

2362 JOHNSON (TM) and ZABIK (ME). Ultrastructural examination of egg albumen protein foams. *J. Food Sci.* 46(4); 1981; 1237-40

2363 FURUTA (K) and MARUYAMA (S). Bacterial contamination on eggs during incubation and hatching, and of fluffs of newly-hatched chicks. *Br. Poult. Sci.* 22(3); 1981; 247-54

Average numbers of bacteria on clean and dirty eggs produced from a specified-pathogen-free chicken flock were $10^{3.0}$ and $10^{4.5}$, respectively. When the eggs were washed with running tap water at about 40 C, the respective bacterial counts were reduced to $10^{2.0}$ and $10^{2.7}$, the latter difference being not significant. After fumigation with formaldehyde from 40 ml formalin (372 g formaldehyde/l) and 20 g potassium permanganate/m^3 for 1 hour, no bacteria were recovered from clean eggs by agar plate culture, while a small number of bacteria were detected in three out of five

dirty eggs. Average numbers of bacteria detected in clean fumigated eggs were $10^{0.8}$ to $10^{1.1}$ during the first 19 days of incubation and $10^{1.2}$ and $10^{1.4}$ were recovered on days 20 and 21 of incubation, respectively. At the end of hatching, eggs containing dead embryos were highly contaminated with $10^{3.8}$ organisms on average. Fluffs of newly-hatched chicks scattered inside the hatcher were contaminated with bacteria at $10^{4.0}$ to $10^{8.4}$ organisms/g. Water in the basin placed in the hatcher and floating fluffs in water were highly contaminated with bacteria. AA

SEAFOODS

2364 SANTHANAKRISHNAN (G). Prospects for diversification of Indian marine products. *Seafood Export J.* 14(2); 1982; 9-13

After reviewing the present status of marine products exported from India, the author stresses the diversification based on resource potential and processing feasibility. KMD

2365 ALAGARAJA (K) and SRINATH (M). Marine fish landings in India : Estimates and precision. *Indian J. Fish.* 27(1&2); 1980; 155-60

Estimates of the landings of marine fish in India including total landings, total prawns, and penaeid prawns - and of exports of fish (total and prawns) from India have been reported for the year 1961-1977, both inclusive. The reliability of these estimates of marine fish production, arrived at by the Central Marine Fisheries Research Institute on the basis of multistage random sampling, has been confirmed by using regression equations derived from the export figures released by the Marine Products Export Development Authority. BSN

FISH

2366 KRISHNA IYER (H), SRINIVASA RAO (P), UNNITHAN (GR), KESAVAN NAIR (AK) and NAIR (RG). Survey on the idle capacity of fish processing (freezing) plants in India. 1. West Coast. *Fish. Technol.* 18(2); 1981; 109-15

Stratified random sampling was used to estimate the extent of idle capacity of fish processing (freezing) plants in the West Coast of India. During 1978 and 1979, the estimates were 76.9% and 73.2% respectively at the rate of 250 working days per annum and two shifts per day. The substantial under utilisation of processing plants was attributed mainly to non-availability of raw material (prawn), high cost of production and shortage of power. MVG

2367 HUANG (DP), HO (JHC), WEBB (KS), WOOD (BJ) and GOUGH (TA). Volatile nitrosamines in salt-preserved fish before and after cooking. *Food Cosmet. Toxicol.* 19(2); 1981; 167-71

The results confirm that certain nitrosamines are formed from precursors during cooking. A possible relationship between salted fish and certain cancers that are particularly prevalent among southern Chinese populations is discussed. AA

2368 SAINSBURY (GF). A comparison of bare and finned pipe coils in frozen fish storages. *Ashrae J.* 23(12); 1981; 21-3

2369 MUKUNDAN (MK), RADHAKRISHNAN (AG), JAMES (MA) and NAIR (MR). Comparative study of the nutrient content of fish and shell fish. *Fish. Technol.* 18(2); 1981; 129-32

Mullet (*Mugil cour*), mackerel (*Rastrelliger kanagurta*), crab (*Scylla serrata*) and prawn (*Penaeus indicus*) were studied for comparative amino acid, mineral and proximate compositions. No major differences were found in nutrient composition between fish and shell fish. Prawn was similar to fish in proximate and mineral compositions. Crab was characterised by higher amounts of moisture, carbohydrates, Fe, Ca and lower amount of fat. The only similarity among the shell fish are their low fat content, higher amounts of total amino acids, sulphur amino acids and aromatic amino acids thus making them nutritionally better than fish. MVG

2370 DEVADASAN (K). Oxidation of residual lipids in fish protein concentrates and its effect on the nutritional quality of the protein. *Fish. Technol.* 18(2); 1981; 71-7

The changes in the nutritive value of fish protein concentrate (FPC) during storage as influenced by the interactions between oxidised residual lipids and the proteins in the FPC are reviewed. The theories put forward for various types of oxidised lipid-protein reaction are reviewed and the reactions have been classified into four general types. The nutritional significance of the reactions are discussed. BSN

2371 BACHHIL, (VN). Microbiological evaluation and keeping quality of fishes reared in livestock sewage fed ponds without artificial feed. *Fish. Technol.* 18(2); 1981; 105-8

Incidence and types of microorganisms and keeping quality of fishes reared in livestock sewage fed ponds without artificial feed were investigated. The initial mesophilic and psychrophilic counts varied from 3.38 to 5.56 and 2.47 to 4.74 respectively and on an average, the counts got reduced by about 40% after evisceration and washing. The refrigerated (8 ± 1 C) life of whole and washed fishes was 4 days. In ice-stored (0-1 C) fish upto 10th day, the average psychrophilic and mesophilic counts varied from 3.66 to 4.81 and 4.61 to 5.24 respectively, those in eviscerated and washed fishes varied from 2.17 to 3.69 and 2.78 to 4.41 respectively. Both were acceptable till the 10th day. *Aerobacter* (Enteterobacter), *Aeromonas*, *Alcaligenes*, *Bacillus*, *Clostridia*, *E. coli*, *Klebsiella*, *Minococci*, *Proteus* and *Pseudomonas* were detected in surface slime and gills. BSN

2372 NIRMALA THAMPURAN, KRISHNA IYER (H) and MAHADEVA IYER(K). The influence of plating technique and incubation temperature on bacterial count from fish and fishery products. *Fish. Technol.* 18(2); 1981; 95-100

Comparative suitability of the two procedures viz. pour plate method (PPM) and spread plate method (SPM) for bacterial sampling of fish and fishery products have been studied. For raw unprocessed fish and frozen fishery products, SPM was found preferable to PPM as incubation at 30 C, gave a higher bacterial count than at 37 C. Variance data indicated that sample variation between different types of fishes was highly significant, while the variations between triplicate plates were not significant at 5% level. BSN

2373 KOSAK (PH) nand TOLEDO (RT). Effects of microbiological decontamination on the storage stability of fresh fish. *J. Food Sci.* 46(4); 1981; 1012-4

The effect of microbiological decontamination on the storage stability of fresh fish was investigated using chlorine pretreatment in combination with various packaging techniques as a means of delaying microbial growth. A 3½ minutes dip in a 1000 µg/ml/free chlorine solution in combination with either a vacuum pack or polyethylene bag with 10% v/w tap water, yielded a 12-day extension of fresh fish quality. Hypoxanthine accumulation was considerably delayed and TBA numbers were significantly lowered. AA

2374 POLO (LM), POZO (R), HERRERA (A), JORDANO (R) and JODRAL (M). Indicator micro-organisms in Spanish, precooked, frozen foods containing fishery products. *An. Bromatol.* 32(1); 1980; 1-16 (Spanish)

The microbiological quality of 179 samples of precooked frozen foods-croquettes, cakes, pies, and fish fingers made from cod, hake, tuna, bonito, *Langostino* (lobster and prawn - made in Spain has been surveyed, and found to be deficient. Spanish legal standards for viable microorganisms and *E. coli* are considered to be too slack, and therefore, a "microbiological limit" of 10^5 colonies, per gram has been suggested. It is also recommended that the number of coliform organisms should be less than 100 per gram. KMD

2375 POLO (LM), POZO (R), HERRERA (A), JORDANO (R) and JODRAL (M). Pathogenic micro-organisms in Spanish, precooked, frozen foods containing fishery products. *An. Bromatol.* 32(1); 1980; 49-60 (Spanish)

179 samples of frozen fish products (see paper on p. 1-16 of this issue) were tested for the presence of enteropathogenic *E. coli*, *Salmonellae*, *Shigellae*, *Staphylococci*, *Cl. perfringens*, and *V. parahaemolyticus*. Three serotypes of enteropathogenic *E. coli* were identified, viz: 020a; 020b; K84(8); 0128:K67(B 12), and 018a 018b:K 76(B20). *Salmonella* germs were identified in 23.55% of the samples; Shigella germs were identified in one sample. Pathogenic *Staphylococci* were found in 7.2% of the samples. The counts of *Cl. perfringens* were very low, being less than 10 in 93.8% of the samples. *V. parahaemolyticus* was not found in any sample. Certain upper limits have been recommended for *Salmonellae*, *Shigellae*, *Staphylococci* and *Cl. perfringens*. KMD

2376 ANON. The secret of the scampi peeler. *Food Manuf.* 56(3); 1981; 47

SARDINE

2377 SARALAYA (KV) and NAGARAJ (AS). Studies on consumer acceptance and quality evaluation of canned sardines and mackerels (Mediterranean style). *Mysore J. Agric. Sci.* 14(2); 1980; 241-5

Oil sardine (*Sardinella longiceps*) and mackerel (*Rastrelliger kanagurta*) from India were shipped to Yugoslavia and canned according to procedure of that country. The canned products, both in Al and Pb plate cans, were tested for quality and acceptance by trained and untrained panel. The products were highly acceptable in overall quality, the only objection being the presence of hard scales and the strange taste of the sauce used for packing sardines. MVG

2378 SURENDRAN (PK) and GOPAKUMAR (K). Selection of bacterial flora in the chlortetracycline treated oil sardine (*Sardinella longiceps*). Indian mackerel (*Rastrelliger kanagurta*) and prawn (*Metapenaeus dobsoni*) during ice storage. *Fish. Technol.* 18(2); 1981; 133-41

Effect of chlortetracycline (CTC) treatment on the bacterial groups at various stages of spoilage of fish under ice storage was studied. During ice storage, the native flora of oil sardine and mackerel, namely, *Pseudomonas* spp. *Moraxella* spp., *Acinetobacter* spp. and *Vibrio* spp. underwent significant stages. At the time of spoilage, the *Pseudomonas* spp. were predominent. *Moraxella* spp. were significantly reduced in the initial stages of spoilage by CTC treatment; but later, *Pseudomonas* spp. reasserted and constituted the bulk of spoilage flora. In prawn, *Pseudomonas* spp., *Acinetobacter* spp. *Moraxella* spp. and *Vibrio* spp. constituted the native flora and a heterogenous flora constituting the first three predominated at the time of spoilage. The flora were significantly changed by CTC treatment, and *Pseudomonas* predominated during spoilage of CTC treated prawns. MVG

TILAPIA

2379 RAMACHANDRAN NAIR (KG) and GOPAKUMAR (K). Influence of sex, spawning, starvation and water temperature on fatty acid composition in *Tilapia mossambica*. *Fish. Technol.* 18(2); 1981; 123-7

A high percentage of C_{22}:6 fatty cacids (9.09%) was found in *Tilapia* egg lipid as compared to body and intestinal lipids. The $C_{16:1}$ acid was less in the egg lipids (3.5%) whereas it was 11% in the body lipids. No significant differences in fatty acid composition of body and intestinal lipids between male and female *Tilapia* were evident. A higher amount of lower fatty acids in the body lipids resulted from starvation. The water temperature influenced fatty acid composition, and the difference was more significant in body lipids than in intestinal lipids. MVG

2380 RATH (S),and MISRA (BN). Changes in nucleic acids and protein content of *Tilapia mossambica* exposed to dichlorvos (DDVP). *Indian J. Fish.* 27(1&2); 1980; 76-81

The fish, exposed to a sub-lethal concentration of dichlorvos (DDVP) of 0.5 mg/1-1 for a period of 21 days, showed lower brain and liver somatic indices, suggesting loss of cells. Post-exposure studies revealed a significant decline in the DNA, RNA and protein contents of the liver, muscle, and brain. The loss of these substances was greater in the liver than in the muscle and brain of the exposed fish. The inhibitory effect of the insecticide on the contents of nucleic acids and protein, markedly increased with longer exposure periods. BSN

CRAB

2381 LOPEZ (A), WILLIAMS (HL) and WARD (DR). Essential elements in raw, boiled, steamed and pasteurized crabmeat. *J. Food Sci.* 46(4); 1981; 1128-31

16 essential elements were determined by atomic absorption spectrophotometry in each crab (*Callinectes sapidus*) product and their contents compared. Effects of boiling, steaming and pasteurising on the retention of these elements were also determined. Percentages of recommended daily allowances of the elements in the products show that all the above produ-

are excellent sources of Cu, P, Na and Zn, and good sources of Ca, Fe, Mg and K. In the processed samples, retention of the elements ranged from 69 - 20.1%. MVG

2382 VIJAYAN (PK) and BALACHANDRAN (KK). Studies on blue discolouration in canned body meat of crab (*Scylla serrata*). *Fish Technol.* 18(2); 1981; 117-22

The blue discolouration in canned crab meat was attributed to copper content exceeding 1.8 to 2.0 mg/100g on dry basis. The copper content could be brought down and the blue discolouration prevented by bleeding the cleaned carcasses thoroughly in running water. Addition of copper ion to raise copper level beyond the above level caused blue discolouration. There was no correlation between incidence of discolouration and freshness of the animals used. Citric acid in high concentration could prevent blue discolouration to some extent but adversely affected texture and flavour. MVG

2383 HEJKAL (TW) and GERBA (CP). Uptake and survival of enteric viruses in the blue crab, *Callinectes sapidus*. *Appl. Environ. Microbiol.* 41(1); 1981; 207-11

SHRIMP

2384 FATIMA (R), FAROOQUI (B) and QADRI (RB). Inosine monophosphate and hypoxanthine as indices of quality of shrimp (*Penaeus merguensis*). *J. Food Sci.* 46(4); 1981; 1125-7, 1131

Shrimp muscle stored in ice for upto 20 days was studied for changes in inosine-monophosphate (IMP) and hypoxanthine (Hx) concentrations and the data correlated with those obtained by sensory evaluation. There was good correlation between IMP concentrations and flavour as well as total sensory scores. Absence of IMP and Hx concentration of 2 micromole and over, per gram of muscle indicated doubtful quality. Hx measurement, therefore, is a good index of quality of ice-stored shrimp. MVG

SEA CUCUMBER

2385 DURAIRAJ (S). Evolving quality standards for beche-de-mer. *Seafood Export J.* 14(3); 1982; 19-22

The Indian beche-de-mer (or sea cucumber) fishery depends on a single species (*Holothuria scabra* (phylum Echinodermata) which is landed on the S-E coast of India (Palk Bay, gulf of Mannar). The potential of this fishery in Tamil Nadu is estimated at 150 t/annum, and in recent years quantities ranging from 25-89 tonnes, have been exported annually to S.E. Asia. The cured, dried product fetches about Rs. 58 per kg. The traditional method of curing and drying has been described, and the proximate compositon has been reported (moisture 15% , crude protein 65%, ash 11%, fat 1%, insoluble ash $< 0.5\%$). The author points out the need to evolve quality standards and methods of cultivating these marine animals, as the potential export market may be about 600 tonnes. KMD

PROTEIN FOODS

2386 BESRAT (A). Protein quality of faffa, the Ethiopian infant formula as affected by pulse substitution. *J. Food Biochem.* 5(3); 1981; 233-8

Faffa, the commercially produced infant formula in Ethiopia, contains approximately 20% protein derived from wheat, soy flour, chick peas and skim milk. The paper examines the effect of substituting the chick peas in Faffa with haricot beans. Protein efficiency ratio (PER) was drastically reduced due to the substitution: Pre-toasting the haricot beans improved the PER value of the Faffa to the level of that of chick peas Faffa. The essential amino acid patterns of the two preparations of Faffa were found to be similar and therefore, could not explain the difference in PER. It was suspected that improvement of PER by heat treatment of the haricot bean Faffa was due to inactivation of the trypsin inhibitor. Analysis for trypsin inhibitor content confirmed that the lower PER value ofor Faffa prepared from untoasted Faffa is due to higher trypsin inhibitor content of haricot beans as compared to chick peas. AA

FRUIT JUICES AND BEVERAGES

2387 HUSSEIN (MM) and MACKAY (DAM). Application of large bore coated (LBC) columns to flavour analysis of beverages and confections. *J. Food Sci.* 46(4); 1981; 1043-50

A large bore coated (LBC) column consisting of 25 ft x ¼ in. o.d. aluminium tubing internally coated with silicone rubber can extract flavours from beverages and dissolved confections. The beverage or solution is simply poured through the column. The column is washed with water, dried with nitrogen, and the trapped organics transferred with heat and nitrogen to a porous polymer pre-column sized to fit the tube oven attached to the injector of the gas chromatograph . A model system of peppermint oil at 2.5 ppm in water showed that quantitative recovery of components in the ppb range was possible. Recovery factors were investigated, revealing interference from colloidal systems as in milk and beer. The LBC column method for flavours in carbonated beverages was compared with solvent extraction and nitrogen sparging methods. Results were comparable. AA

ORANGE JUICE

2388 MANNHEIM (CH) and HAVKIN (M). Shelf-life of aseptically bottled orange juice. *J. Food Process. Preserv.* 5(1); 1981; 1-6

In comparison with the thermally processed food product, the aseptically filled ones which receive considerably less heat treatment, is thought to have better taste, texture and colour, and exhibit less damage to nutritive properties. The storage stability of aseptically bottled juice stored at 4,15, 25 C was compared to that of hot filled juice. Criteria for stability were ascorbic acid retention, browning as measured by optical density, tristimulus colour reflectance and organoleptic evaluation. It was found that the governing factor of establishing shelf-life was storage temperature rather than the method of filling. The quality para-

meters for the juices stored at 4 and 15 C were similar for both methods of filling. No difference was found in sensoric evaluations between aseptically filled juices and hot-filled juices stored at the same temperatures after 60 days storage. Immediately after filling, the aseptically filled juice was judged slightly better, but this difference disappeared rapidly during storage even at 4 C. In all cases, juices stored at the lower storage temperature were judged better than those stored at the higher temperature regardless of filling method. AA

TEA

2389 TAKEO (T) and TSUSHIDA (T). Changes in lipoxygenase activity in relation to lipid degradation in plucked tea shoots. *Phytochemistry.* 19(12); 1980; 2521-2

COFFEE

2390 NEWMAN (JR). Estimation of coffee, chicory and glucose solids contents of instant coffee products. *J. Assoc. Public Anal.* 19(Pt 2); 1981; 59-64

Simple methods for the determination of caffeine, total ketoses after hydrolysis and total aldoses after hydrolysis as measures of the coffee, chicory and glucose solids contents respectively are described. These methods are in use in the Government Analysts' Laboratory in Zimbabwe, and may be of use in other laboratories lacking high pressure liquid chromatography apparatus. AA

ALCOHOLIC BEVERAGE

2391 BECK (O) and HOLMSTEDT (B). Analysis of 1-methyl-1, 2,3,4-tetrahydro-β-carboline in alcoholic beverages. *Food Cosmet. Toxicol.* 19(2); 1981; 173-7 .

Multiple ion detection showed 1-methyl-1,2,3,4-tetrahydro-β-carboline to be present in alcoholic beverages prepared by fermentation processes. The range of concentrations was 4.8-450 mol/litre in wine and 9.1-69 n mol/litre in beer. This compound potentiates the action of mutagens in bacterial systems. KMD

2392 CAPUTI (A) Jr. Conversion of alcohol content to percentage by volume at various temperatures. *Am. J. Enol. Vitic.* 32(2); 1981; 256

BEER

2393 PEREZ OLMOS (R) and ECHE VARRIA (J). Ion-selective electrode in analysis of beer. I. Determination of chlorides. *An. Bromatol.* 32(1); 1980; 85-92 (Spanish)

Levels of chloride ions in 40 European beers have been measured using a chloride-ion-selective electrode. The technique of addition of a known amount has been accurate and precise enough for the quick determinations required in quality control. The results show good agreement with those obtained by the standard, conductimetric method. KMD

OILS AND FATS

2394 Application of gas-liquid chromatography to the analysis of essential oils. Part VIII. Fingerprinting of essential oils by temperature - programmed gas-liquid chromatography using methyl silicone stationary phases. *Analyst.* 106(1261); 1981; 448-55

Problems of obtaining reproducible results in the "fingerprinting" of essential oils by temperature-programmed gas-liquid chromatography have been examined and reported in Part VII of this series. That report was concerned both with the general problems and with the specific use of a polar stationary phase, i.e., Carbowax 20M. This report is concerned with the use of non-polar stationary phases of the methyl silicone type and the application of the method of column standardisation described in Part VII. A collaborative study with methyl silicone stationary phases and a specification of "g-pack values" for the column packing has resulted in the production of a method that yields reproducible relative retention indices for the test substances limonene, acetophenone, linalol, naphthalene, linalyl acetate and cinnamyl alcohol and has been applied with satisfactory results to oils of bergamot, Jamaican ginger, Nigerian ginger, West Indian nutmeg and East Indian nutmeg. A recommended method is given for the reproducible temperature-programmed gas-liquid chromatographic fingerprinting of essential oils when methyl silicone stationary phases are used. AA

2395 Application of gas-liquid chromatography to the analysis of essential oils. Part IX. Determination of eugenol in oil of cinnamon bark. *Analyst.* 106 (1261); 1981; 456-60

The essential oil obtained from cinnamon leaves has a high content of eugenol whereas the genuine oil from cinnamon bark has a low eugenol content. Determination of the eugenol content of a sample reputed to be cinnamon bark oil provides a method for the detection of adulteration by addition of cinnamon leaf oil. This determination has been carried out by gas liquid chromatography using a non-polar stationary phase. AA

GROUNDNUT OIL

2396 FONG (LYY) and CHAN (WC). Long-term effects of feeding aflatoxin-contaminated peanut oil to Sprague-Dawley rats. *Food Cosmet. Toxicol.* 19(2); 1981; 179-83

Over 90% of Hong Kong households use peanut oil for cooking purposes; the experimental data presented in this paper indicate a possible health hazard from this oil which is contaminated with aflatoxin B_1 at the level of 110 ppb (µg/kg). KMD

FAT

2397 ANON. Value added fat products. *J. Oil Technol. Assoc. India.* 13(2); 1981; 73-99

The texts of the papers presented at the seminar on 'Value Added Fat Products' held in Bombay on 7th October 1979 have been published. The following are the papers presented:

G. Lakshminarayana. Castor oil derivatives. p 75-83; R.K. Marfatia, Oil in surface coatings. p 84-8; A. Ganapathy. Packaging of confectionery fats for export. p 88. A.D. Karve. Research findings in agricultural technology of oilseeds. p 89-90; S.N. Modak. Fat-based chemicals, p 90; G. Lakshminarayana. Value added fat products. p 91; K.K.G. Menon. Fats in nutrition. p 92; K.K. Ajila. Export potential of value added oils and fat products. p 93; N.B. Godrej. Exports of value-added fat products. p 94-5; B.R. Shah. Exports of value-added oilseeds products. p 96-7; V.G. Udeshi. Export potential of value added fat products - castor oil derivatives. p 98-9. KMD

2398 FUCHS (G) and KUIVINEN (J). Examination of two rapid methods for control of frying fat. *Var Foda.* 32(8); 1980; 419-24 (Swedish)

Two commercially available test methods for control of frying fat have been examined. The Food oil Sensor (Northern Instrument Corp. USA) is an electric instrument designed for measurement of dielectricity constant in fats and oils. The dielectricity constant of fat tends to increase during the frying procedure because the content of polar compounds increases. The Rau-test (developed by H Meyer in Bielefeld, FRG) is a chemical method for determination of oxidized fatty acids in frying fat. The determination is based on a visual judgement of colour reaction. AA

SPICES AND CONDIMENTS

ONION

2399 MUNZNER (R) and RENNER (HW). Mutagenicity testing of irradiated onion powder. *J. Food Sci.* 46(4); 1981; 1269-70, 1275

Onion powder, irradiated at average doses of 15, 950, and 1360 krad, was investigated using the *Salmonella*/mammalian-microsome mutagenicity assay and the *in vivo* sister chromatid exchange (SCE) test. Cold-water and hot-water extracts of nonirradiated and irradiated onion powder did not show any mutagenic effect when tested with or without metabolic activation in the Ames test. Neither were differences between irradiated and unirradiated onion powder observed in the SEC test. AA

CHILLIE

2400 IQBAL (BA). Chillies, ginger and turmeric. Trends in production and export. *Agric. Situation India.* 36(10); 1982; 745-9

CINNAMON

2401 SHANKARANARAYANA (ML), RAGHAVAN (B), ABRAHAM (KO) and NATARAJAN (CP). Titrimetric determination of total aldehydes in cinnamon bark and leaf oils using chloramine-T reagent. *J. Food Qual.* 4(1); 1981; 35-41

A titrimetric method for determining cinnamaldehyde has been developed; it is based on the quantitative reaction of the aldehyde with semicarbazide hydrochloride to form the semicarbazone. The semicarbazone is removed and the excess unreacted semicarbazide determined iodometrically using chloramine-T reagent. Two moles of chloramine-T are required per mole of

the semicarbazide. The method has been used in the routine quality evaluation of cinnamon oils and the samples required are about 0.02 g for bark oils and 0.05 g for leaf oils. AA

SENSORY EVALUATION

2402 WEISS (JJ). Selection of sensory judges. *J. Food Qual.* 4(1); 1981; 55-63

The abilities of 70 individuals to serve as judges in laboratory-type sensory panels were investigated. The ability to detect differences between the degrees of corrosion of cans and a low variability in judgements served as criteria for acceptance or rejection of an individual as sensory judge. An unstructured rating scale method was used for the sensory analysis. Data were evaluated by means of Spearman's rank correlation coefficient as well as by Wald's sequential analysis. Spearman's rank correlation coefficient proved to be of only limited value in this instance, because it did not yield the desired effect of separation, whereas Wald's sequential analysis allowed to influence the number of accepted judges by properly specifying calculation parameters. AA

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

2403 EDIZ (SH) and DAVIS (GRF). Repellency of rapeseed extracts to adults of *Tribolium castaneum* and *Tribolium Confusum* (Coleoptera: Tenebrionidae). *Can. Entomol.* 112(9); 1980; 971-4

2404 MITJAVILA (S), CARRERA (G), BOIGEGRAIN (R-A) and DERACHE (R). I. Evaluation of the toxic risk of DDT in the rat: During accumulation. *Arch. Environ. Contam. Toxicol.* 10(4); 1981; 459-69

An investigation was undertaken on the accumulation of DDT and its metabolites in the rat. Rats received 14.5 mg DDT/kg b.w. every day for 52 days. Growth, food intake, body composition, and the activities of various enzymes were little affected. However, the level of total lipids fell 30% and the weight of the liver rose 20% due to cellular hypertrophy induced by the DDT. The quantity of DDT and its metabolites found in the carcass was 24 mg/rat i.e. three times that found in rats dead after a single dose of 200 mg/kg. Liver and brain contained 130 µg/rat and µ10 g/rat, respectively i.e. five times lower than those found in the rats which died from an acute dose of DDT. In the carcass, p, p' DDT accumulates more than p, p' DDE or p, p' DDD; the latter is preponderant in the liver. AA

2405 MITJAVILA (S), CARRERA (G) and FERNANDEZ (Y). II. Evaluation of the toxic risk of accumulated DDT in the rat: During fat mobilization. *Arch. Environ. Contam. Toxicol.* 10(4); 1981; 471-81

The effects of greatly reduced food intake were investigated in rats which had accumulated three times as much DDT as rats killed with a single dose approaching LD_{50}. DDT and its metabolites mobilized more quickly than the fat deposits. The hypertrophy of the liver due to DDT decreased during food restriction and demonstrated the existence of a large detoxication capacity shown through the high metabolism of the pesticide. The disappearance of p, p' DDE was most rapid, followed by p,p' DDD and then p.p' DDT; they did not accumulate in the fat reserves. The half-life of the pesticide, which is normally three months in the rat, was reduced to five days under the experimental conditions. In spite of rapid mobilization, no major toxic signs were detected from either nutritional, physiopathological, or biochemical examinations. AA

BIOCHEMISTRY AND NUTRITION

2406 AHARONOWITZ (Y) and DEMAIN (AL). Thoughts on secondary metabolism. *Biotechnol. Bioeng.* 22(Suppl. 1); 1980; 5-9

2407 HIROSE (Y) and SHIBAI (H). Amino acid fermentation. *Biotechnol. Bioeng.* 22(Suppl. 1); 1980; 111-25

2408 ESAKI (N), SODA (K), KUMAGAI (H) and YAMADA (H). Recent advances in enzymatic synthesis of amino acids. *Biotechnol. Bioeng.* 22(Suppl.1); 1980; 127-41

2409 DEESLIE (WD) and CHERYAN (M). Continuous enzymatic modification of proteins in an ultrafiltration reactor. *J. Food Sci.* 46(4); 1981; 1035-42

The feasibility of producing protein hydrolyzates using an ultrafiltration (UF) reactor system was evaluated. Soy protein isolate is reacted with a soluble protease in a reaction vessel coupled in a semi-closed loop configuration to a hollow fiber UF unit. Reaction products are pumped past the membrane where hydrolyzate of molecular size small enough to pass through the membrane is removed as permeate. Enzyme and unreacted protein are recycled back to the reaction vessel. The effect of operational parameters such as flow rate (flux), reaction volume, substrate, and enzyme concentration on reactor product output and conversion were studied. The product is typically 91% hydrolyzed protein (N x 6.25) and 9% ash, dry basis, and contains at least four fractions of molecular weight 2500 or less. AA

2410 ANNAN (WD) and MANSON (W). The production of lysinoalanine and related substances during processing of proteins. *Food Chem.* 6(3); 1981; 255-61

Processing foods may cause unintended changes in their constituent, proteins. Bovine milk protein studies have assisted in understanding the formation of lysinoalanine, which has toxic properties, and some phosphoproteins. Protein lysyl residues may enter the Maillard reaction with degradation products of carbohydrates, but losses of lysine can occur in the absence of free carbohydrate. Other alanines have also been detected. The study of bovine milk casein complex, via its four components, has yielded additional understanding of lysinoalanine formation, and has indicated

that it corresponded to the lysine loss, but not to the serine loss. The studies report the effect of gentle heat and alkali at neutral pH, but greater heat at the same pH has yielded lysinoalanine cyanate, formed from milk year, which may lead to homocitrulline formation. AA

2411 MORDUE (W) and STONE (JV). Structure and function of insect peptide hormones. *Insect Biochem.* 11(3); 1981; 353-60

2412 GREGER (JL) and JOHNSON (MA). Effect of dietary tin on zinc, copper, and iron utilization by rats. *Food Cosmet. Toxicol.* 19(2); 1981; 163-6

Rats fed on a tin-supplemented diet (206 µg tin as stannous chloride per gram of feed) for 21 days retained significantly higher levels of tin in their kidneys and tibias, and significantly lower levels of copper in their kidneys, than the control animals. The experimental animals also lost more zinc in their faeces than the control animals. KMD

2413 NOJEIM (SJ), CLYDESDALE (FM) and ZAJICEK (OT). Effect of redox potential on iron valence in model systems and foods. *J. Food Sci.* 46(4); 1981; 1265-8

The effect of redox potential on the ionization and valence of four iron compounds was investigated. A model system was designed to control the redox potential of pH 4.2 phthalate buffers to which the iron was added. The applicability of predictions made from results obtained in the model systems was assessed by adding the same iron compounds to three food products of differing redox potentials and comparing trends of ionization and valence. A relationship between redox potential and the valence of ionized iron was observed. AA

2414 RAMAMURTHI (B). Malnutrition and mental retardation in developing countries. *Baroda. J. Nutr.* 8; 1981; 1-4

2415 RAJALAKSHMI (R). Behavioural development of underprivileged and malnourished children. *Baroda J. Nutr.* 8; 1981; 5-13

2416 POEI-LANGSTON (MS) and WROLSTAD (RE). Colour degradation in an ascorbic acid-anthocyanin-flavanol model system. *J. Food Sci.* 46(4); 1981; 1218-22, 1236

Interactions between ascorbic acid, pelargonidin-3-glucoside, and catechin were studied in pH 3,4 citrate-phosphate buffer at 20 C under anaerobic and oxygenated conditions. Changes in anthocyanin pigment, ascorbic acid, dehydroascorbic acid, and catechin were quantitatively measured during 130 days storage along with Hunter colour parameters, browning, and polymeric colour. Ascorbic acid had a statistically significant effect on all parameters, including anthocyanin loss under both oxygen and nitrogen environments, catechin loss, increase in browning and polymeric colour, decrease in Hunter "a" value and increase in Hunter L value. Ascorbic acid bleached anthocyanin pigment and also induced browning. There is evidence that anthocyanin pigment and ascorbic acid degrade through a direct condensation mechanism. AA

2417 MEINE (W). Determination of vitamin D in dietetic food by remission spectrometry. *Z. Lebensmittel-Unters. Forsch.* 170(4); 1980; 251-3 (German)

This method deals with the determination of vitamin D in dietetic food, especially in baby food. For this purpose, normally 4 clean-up and enrichment steps are necessary (extraction, saponification, liquid-solid chroma-

tography and TLC), followed by the determination of vitamin D by means of reflectance spectroscopy. AA

2418 SOUTHGATE (DAT). What is 'dietary fibre?' *Food Technol. Aust.* 33(1); 1981; 24-5

The evolution of the term dietary fibre and its definition and the nature and composition of dietary fibre are discussed. KAR

2419 RAJAMMAL DEVADAS (P), KAMALANATHAN (G) and VIJAYALAKSHMI (P). Leaf protein feeding trials with preschool children in Coimbatore. I. Processing of leaf protein. *Indian J. Nutr. Dietet.* 17(12); 1980; 433-6

The equipment described for the production of fibre free, lucerne leaf protein rich concentrate consists of pulper, continuous belt press, steam injector, beam press, mini-mix, coal fired steam generator, Kilburn hot flow air oven, spring balance and Yamato scale. The process in brief involves collection of 20 days old cuttings of young lucerne (*Medicago sativa*) plants, separation and washing of leaves with water, chopping and pulping of leaves, filtering of juice, coagulation of protein in the juice by coagulation with steam injection at 90 C, separation of leaf protein cake by filtration, washing and drying to yield a powdered leaf protein. BSN

TOXICOLOGY AND HYGIENE

2420 PARK (KY) and BULLERMAN (LB). Increased aflatoxin production by *Aspergillus parasiticus* under conditions of cycling temperatures. *J. Food Sci.* 46 (4); 1981; 1147-51

Certain products like cheese are displayed for promotional purposes without refrigeration, exposing those products to conditions of temperature cycling. If aflatoxin producing molds are present in these products as contaminants, the temperature-cycling and other environmental conditions may promote growth and production of aflatoxin. Therefore, aflatoxin production by *Aspergillus parasiticus* in yeast extract-sucrose (YES) as influenced by cycling temperatures (5 C for 12 hours and 25 C for 12 hours) was studied. Results show that the above cycling temperatures resulted in higher levels of aflatoxin B_1 and G_1 than constant incubation at 25 C. This effect was enhanced as the preincubation period at 25 C was increased from 0 to 3 days. It was thus shown that keeping the mold at optimum temperature was a more important factor in aflatoxin production than total thermal input. Further, fluctuating temperatures, combined with preincubation at optimum temperatures for a certain time, appeared stimulate aflatoxin biosynthesis significantly. MVG

2421 GUNNISON (AF), FARRUGGELLA (TJ), CHIANG (G), DULAK (L), ZACCARDI (J) and BIRKNER (J). A sulphite-oxidase-deficient rat model: Metabolic characterization. *Food Cosmet. Toxicol.* 19(2); 1981; 209-20

The ability of sulphite-oxidase-deficient rats (1% of normal activity) to clear sulphite following intragastric sulphite administration was compared with that of normal rats. The results showed that deficient rats were much less efficient at this process, and thus required lower exogenous doses to produce equivalent systemic exposures. KMD

2422 GUNNISON (AF), DULAK (L), CHIANG (G), ZACCARDI (J),and FARRUGGELLA (TJ). A sulphite-oxidase-deficient rat model: Subchronic toxicology. *Food Cosmet. Toxicol.* 19(2); 1981; 221-32

A 4/149 incidence of mammary adenocarcinoma was observed in the sulphite-oxidase-deficient rats(all in rats aged less than 5 months), compared to 0/143 observed in age-matched rats with normal sulphite oxidase. Although this result is not statistically significant, the rarity of spontaneous tumours of this type among rats of this age suggests that these carcinomas may, infact, have been treatment related. KMD

2423 OGATA (S). Bacteriophage contamination in industrial processes. *Biotechnol. Bioeng.* 22(Suppl.1); 1980; 177-93

2424 DRAUGHON (FA) and NELSON (PJ). Comparison of modified direct-plating procedures for recovery of injured *Escherichia coli*. *J. Food Sci.* 46(4); 1981; 1188-91

2425 ZAIKA (LL) and KISSINGER (JC). Inhibitory and stimulatory effects of oregano on *Lactobacillus plantarum* and *Pediococcus cerevisiae*. *J. Food Sci.* 46(4); 1981; 1205-10

Effect of oregano, a spice, on the viability and acid production of commercial starter cultures of *L. plantarum* and *P. cerevisiae* and the inhibitory and stimulatory factors involved were investigated. Increase in concentrations of oregano from 0.5 to 8 g/L in liquid medium resulted in stimulation, delay or inhibition of acid production and viability. Solvent extraction or autoclaving removed the inhibitory factor and the residues from these treatments stimulated acid production. Sublethal oregano concentrations that had delayed growth and acid production also caused the organisms develop resistance to the deleterious effects of the spice *L. plantarum* was more resistant than *P. cerevisiae* to the inhibitory effects of the spice. MVG

2426 BATISH (VK), CHANDER (H), GHODEKAR (DR) and RANGANATHAN (B). Production of thermonuclease deficient mutants from an enterotoxigenic thermonuclease producing strain of *Staphylococcus aureus*. *J. Food Sci.* 46(4); 1981; 1252-4

A toxigenic strain of *Staphylococcus aureus* known to produce both thermonuclease and enterotoxin was exposed to ultraviolet radiations. Thermonuclease deficient mutants were recovered on methylgreen-DNA-agar medium. All of twenty thermonuclease deficient mutants lost the capacity to produce coagulase, enterotoxin, and lecithinase. However, these functions were regained upon reversion with visible light (Photoreactivation), thus suggesting a coordinated control mechanism for the synthesis and release of the above metabolites. These characteristics in most of the mutants remained stable for 3 months. AA

2427 LEWIS (NF) and GOVEKAR (LG). Effect of gamma radiation on toxicity and immunogenicity of *Salmonella typhimurium*. *J. Food Safety.* 3(3); 1981; 165-82

2428 COGAN (TM), O'DOWD (M) and MELLERICK (D). Effects of pH and sugar on acetoin production from citrate by *Leuconostoc lactis*. *Appl. Environ. Microbiol.* 41(1); 1981; 1-8

2429 DAVEY (GP) and RICHARDSON (BC). Purification and some properties of diplococcin from *Streptococcus cremoris* 346. *Appl. Environ. Microbiol.* 41(1); 1981; 84-9

2430 HICKEY (CS) and JOHNSON (MG). Effects of pH shifts, bile salts, and glucose on sporulation of *Clostridium perfringens* NCTC 8798. *Appl. Environ. Microbiol.* 41(1); 1981; 124-9

2431 HALDER (CA), TABER (RA) and CAMP (BJ). Absence of sporidesmin production by twelve texas isolates of *Pithomyces* spp. *Appl. Environ. Microbiol.* 41(1); 1981; 212-5

2432 LABBE (RG). Enterotoxin formation by *Clostridium perfringens* A in a defined medium. *Appl. Environ. Microbiol.* 41(1); 1981; 315-7

2433 KOSTENBADER (KD) JR. and CLIVER.(DO). Flocculants for recovery of foodborne viruses. *Appl. Environ. Microbiol.* 41(1); 1981; 318-20

2434 VESONDER (RF), ELLIS (JJ) and ROHWEDDER (WK). Swine refusal factors elaborated by *Fusarium* strains and identified as trichothecenes. *Appl. Environ. Microbiol.* 41(1); 1981; 323-4

2435 NOAD (D). Clean vessels: How to handle the hazards. *Food Flavour. Ingred. Packag. Process.* 3(7); 1981; 15, 20

2436 PEACE (C) and ATKINSON (WF). A survey of potential employee health hazards due to vapours from materials used in shoe repair shops. *Environ. Health.* 89(3); 1981; 66-9

2437 BIRD (PWE). Personal hygiene for food handlers. *Environ. Health.* 89(3); 1981; 64-6

GENERAL

2438 HOUSTON (GP). Problems with energy.
Food Manuf. 56(4); 1981; 19,21,25 and 29

2439 MILNE (IM). The food industry in the next ten years.
Food Technol. Aust. 33(6); 1981; 296-8

2440 RITCHIE (PD). Food odyssey - 2001. Take-away food.
Food Technol. Aust. 33(6); 1981; 286-7
Deals with the developments in Australia. KAR

2441 BOARD (PW). Applied research for the food industry: Opportunities and constraints.
Food Technol. Aust. 33(6); 1981; 266-8, 270

FOOD PROCESSING AND PACKAGING

2442 BINDER (H) and WIESMANN (U). Sedimentation from mixed-grain suspensions in inclined pipes of circular and rectangular cross section under laminar flow conditions.
Chemie. Ingenieur-Technik. 52(4); 1980; 332-3 (German)

2443 MERSON (RL), LEONARD (SJ), MEJIA (E) and HEIL (J). Temperature distributions and liquid-side heat transfer coefficients in model liquid foods in cans undergoing flame sterilization heating.
J. Food Process Eng. 4(2); 1981; 85-98
Heat transfer studies were performed with clay suspensions and sugar solutions in 303 x 406 cans heated singly in a flame process simulator. Experimental results show that the can wall temperature does not reach excessive temperatures and that the temperature distribution throughout the can is uniform. The slowest heating point was on the axis near the end of the can but this temperature lagged the center temperature by less than 3 C even with adverse heating conditions (i.e. no head space). The liquid-side heat transfer coefficient in 60% sucrose solution at 30 rpm was measured to be 466 $\pm$ 34 W/m^2K based on the cylindrical area of the can. Rotational speed had only a small effect on heating rate in the range of 10 to 120 rpm. AA

2444 CURNUTTE (B). Principles of microwave radiation.
J. Food Prot. 43(8); 1980; 618-24

2445 HARRISON (DL). Microwave versus conventional cooking methods: Effects on food quality attributes.
J. Food Prot. 43(8); 1980; 633-7

2446 FUNG (DYC) and CUNNINGHAM (FE). Effect of microwaves on microorganisms in foods.
J. Food Prot. 43(8); 1980; 641-50

2447 HAYWARD (LH) and KROPF (DH). Sample position effects on moisture analyses by a microwave oven method.
J. Food Prot. 43(8); 1980; 656-7, 663

2448 DASGUPTA (PK). Packaging developments in India.
Perfectpac. 21(1); 1981; 10-13

2449 MAHADEVIAH (M) and ANANDASWAMY (B). Role of CFTRI in the development of packaging materials for processed food products.
Indian Food Packer. 35(5); 1981; 27-30
A brief resume covering the work done on canning of foods which includes Rourkela hot dipped tinplate; Rourkela electrolytic tinplate; corrosion with mango, orange, tomato, potato, and ivy gourd products; hard swell in jam cans, sulphur staining and corrosion; assessment of differential tinplate; flexible packaging materials; defects in imported cans; and future scope. BSN

2450 TALWAR (A). Packaging for product protection.
Perfectpac. 21(1); 1981; 6-7,20

2451 AGARWALA (AK). Aluminium industry in India.
Perfectpac. 21(1); 1981; 14-6, 22

2452 SWOZIL (A) and ULLMANN (G). Under what conditions are anticorrosion liners made from fluorinated plastic film effective.
Chemie-Ingenieur-Technik. 52(4); 1980; 292-8 (German)

2453 LEVERICK (PD). Anticipating future requirements in adhesive application equipment in the 80's.
Perfectpac. 21(1); 1981; 8-9

FOOD ENGINEERING AND EQUIPMENT

2454 ANON. Profits and efficiency increased by flour mill automation.
Milling Feed Fert. 164(4); 1981; 22-5

2455 ANDREWS (C). Cryogenics : something more than freezing.
Food Flavour. Ingred. Packag. Process. 3(9); 1981; 26-9
Discusses the genesis, development, problem of heat removal and then advantages for application of low temperature in the application of cryogenics to storage of food. BSN

2456 SCHMIDT (P) and WALZEL (P). Atomization of liquids.
Chemie-Ingenieur-Technik. 52(4); 1980; 304-11 (German)

2457 GOOD (DL). Practical applications of microwave energy: Introduction.
J. Food Prot. 43(8); 1980; 617

2458 ANNIS (PJ). Design and use of domestic microwave ovens.
J. Food Prot. 43(8); 1980; 629-32

2459 MORGAN (S). Cold store design : A function of distribution?
Food Flavour. Ingred. Packag. Process. 3(9); 1981; 44-7

2460 ANON. Big advantages cited for hot-air aseptic systems.
Food Eng.Int. 6(5); 1981; 58-9, 61-2

2461 ERNST (H). Economical steam production.
Flussiges Obst. 47(4); 1980; 139-42 (German)

2462 MARTIN (H). Heat and mass transfer in fluidized beds, Chemie-Ingenieur-Technik. 52(3); 1980; 199-209 (German)

2463 GNIELINSKI (V). Heat and mass transfer in packed beds. Chemie-Ingenieur-Technik. 52(3); 1980; 228-36 (German)

2464 STICHLMAIR (J). Performance and cost comparisons for various kinds of liquid/liquid extraction equipment. Chemie-Ingenieur-Technik. 52(3); 1980; 253-5 (German)

2465 ZIMMERMANN (V), HALWACHS (W) and SCHUGERL (K). Mass transfer studies during droplet formation with a modified liquid scintillation measuring technique. Chemie-Ingenieur-Technik. 52(3); 1980; 259

2466 BOCK (H-J) and MOLERUS (O). Influence of flow mechanics on heat transfer in gas/solid fluidized beds. Chemie-Ingenieur-Technik. 52(3); 1980; 260-61 (German)

2467 BROCKERHOFF (P). Internal insulation for vessels and piping. Chemie-Ingenieur-Technik. 52(3); 1980; 269 (German)

2468 RIQUARIS (H-P). Particle/fluid heat transfer in beds through which gas is flowing. Chemie-Ingenieur-Technik. 52(3); 1980; 270-71 (German)

2469 LADWIG (H-P) and REUTER (H). Flow and local heat transfer in plate heat exchangers. Chemie-Ingenieur-Technik. 52(3); 1980; 273 (German)

2470 HILGRAF (P). Mixing in gravitational rotating mixers. Chemie-Ingenieur-Technik. 52(3); 1980; 280-81 (German)

FOOD CHEMISTRY AND ANALYSIS

2471 ARMIJO (F), SAN MARTIN (J) and ARMIJO (M). Magnesium content and calcium-magnesium ratio in some bottled mineral waters. An. Bromatol. 32(3); 1980; 215-22 (Spanish)

Ca and Mg contents in 25 bottled mineral waters were determined by atomic absorption spectrophotometry. All the samples contained "permitted" amounts of Ca and Mg, and 80% of the samples had Ca and Mg contents that may be classified as "convenient" according to the Spanish Food Code. The Ca/Mg ratio in these waters has been compared with the recommended values of this ratio in (a) a minimum necessary diet, (b) plasma levels, and (c) the recommendations regarding drinking waters in the Spanish Food Code. KMD

2472 TENG (TT) and SEOW (CC). A comparative study of methods for prediction of water activity of multicomponent aqueous solutions. J. Food Technol. 16(4); 1981; 409-19

2473 TOMASSONE (R), ARIES (F), CHAMBROY (Y), FLANZY (C) and LECOMTE (A). Automatic analysis of chromatogramme records. Ann. Technol. Agric. 29(1); 1980; 75-88 (French)

Real-time acquisition and automatic processing of data from an Amino-Acid Analyser have been realized by connecting it to a Mitra 15 computer. Tape recording replaces the direct line when real-time processing is not necessary. Processing methods involving, have been performed together with the dissociation of overlapping peaks. AA

2474 WARREN (RG). Ion chromatography.
Food Technol. Aust. 33(6); 1981; 300-302
A new liquid chromatographic technique for the determination of anions, cations, and selected organic acids is described with emphasis on applications to the beverage and dairy industries. KAR

2475 ANON. Routine employment of liquid chromatography for polyphosphates analysis.
Ind. Aliment. 19(173); 1980; 488-91 (Italian)

2476 EL-SHAARAWY (MI). A novel approach for phosphorus determination by atomic absorption spectrophotometry.
Ind. Aliment. 19(173); 1980; 477-82 (Italian)
Phosphorus interference with spectral atomic absorption of calcium is suggested as a method for its determination by AAS. Sensitivity is highest at P/Ca ratios lower than 0.5, and higher in air/hydrogen than in air/acetylene flame. The latter flame is however, preferred for the weaker chemical interference. Interference is further controlled by diluting the samples by calcium solution to a P/Ca ratio of 0.5 or lower. AA

2477 KUJAWSKI (M) and WEGRZYN (M). On the possibility of alpha-glucosidase activity determination in the presence of glucoamylase.
Starch. 32(2); 1980; 63-6
An attempt has been made to reveal and to determine the activity of α-glucosidase in the presence of glucoamylase, by applying one of the three following methods. Each of them requires the determination of glucoamylase activity on the 2% starch substrate as well as: (a) the calculation of difference between this activity and the amount of glucose produced from substrate 4% starch + 0.5% maltose; (b) the calculation of the difference between this activity and the activity determined on combined substrate 10% starch + 0.5% maltose, (c) the calculation of the glucoamylase activity determined on 1% maltose substrate and then the substraction of this value from the results really obtained on this substrate. The best method seems to be (b), though it has some analytical disadvantages. KMD

2478 SOUTY (M), LAPIZE (F) and BREUILS (L). Simultaneous determination with an automated analyser of galacturonic acid and neutral sugars in pectic substances analysis.
Ann. Technol. Agric. 29(1); 1980; 89-98 (French)
The use of both chromogens : methoxyhydroxydiphenyl (MHDP) and sulphuric orcinol, are necessary to characterize pectic substances, in particular when liquid chromatographic techniques are involved: MHDP determines only galacturonic acid while orcinol gives in the same time galacturonic acid and neutral sugars. It is then possible to have the true rate of galacturonic acid and neutral sugars in the sample. The simultaneous use of the two reactions on automated analyser is developed which allows the determination of 15 samples per hour. AA

2479 TANCHEV (ST). On the FOLIN DENIS method for determination of polyphenolics contained in plant food products.
Nahrung. 24(7); 1980; 615-8 (German)
The possibility of applying the FOLIN-DENIS method was investigated to determine the thermal degradation of anthocyanins. This method was compared with the FULEKI-FRANCIS method. The anthocyanins pelargonidin-3-sophoroside, cyanidin-3-sophoroside, and delphinidin-3-rutinoside were used as model substances. The heating of the samples was carried out in a solution of 0.05 M citrate·buffer at pH = 3,5 at 100 C. From the results obtained, it became evident that the

FOLIN-DENIS method cannot be applied to investigate the kinetics of the anthocyanin thermal degradation due to the additional reaction of the degradation products. AA

FOOD MICROBIOLOGY

2480 SAMMONS (RL), MOIR (A) and SMITH (DA). Isolation and properties of spore germination mutants of *Bacillus subtilis* 168 deficient in the initiation of germination.
J. Gen. Microbiol. 124 (Pt .2); 1981; 229-41

2481 WARBURG (RJ) and MOIR (A). Properties of a mutant of *Bacillus subtilis* 168 in which spore germination is blocked at a late stage.
J. Gen. Microbiol. 124 (Pt.2); 1981; 243-53

2482 KOSHIKAWA (T), NAKASHIO (S), KUSUYAMA (K), ICHIKAWA (T) and KONDO (M). Presence of cysteic acid in the sporangium and its metabolic pathway during sporulation of *Bacillus subtilis* NRRL B558.
J. Gen. Microbiol. 124(Pt.2); 1981; 415-23

2483 LANDEN (R), HEIERSON (A) and BOMAN (HG). A phage for generalized transduction in *Bacillus thuringiensis* and mapping of four genes for antibiotic resistance.
J. Gen. Microbiol. 123(Pt.1); 1981; 49-59

2484 METZ (B), DE BRUIJN (EW) and VAN SUIJDAM (JC). Method for quantitative representation of the morphology of molds.
Biotechnol. Bioeng. 23(1); 1981; 149-62

2485 KENNEDY (JE) Jr., PHILLIPS (PE) and OBLINGER (JL). Effect of stored pre-poured plates on microbial enumeration using the surface plate method.
J. Food Prot. 43(8); 1980; 592-4

2486 OWADES (JL). The role of osmotic pressure in high and low gravity fermentations.
MBAA. Tech. Quart. 18(4); 1981; 163-5

2487 CLARKE (BJ), DAVINE (DF), HAWTHORNE (DB), KAVANAGH (TE) and MOULDER (PJ). Factors affecting the formation of medium chain fatty acids during fermentation.
MBAA. Tech. Quart. 18(4); 1981; 188-94

2488 WILKE (CR), YANG (RD), SCIAMANNA (AF) and FREITAS (RP). Raw materials evaluation and process development studies for conversion of biomass to sugars and ethanol.
Biotechnol. Bioeng. 23(1); 1981; 163-83

2489 NOVAK (M), STREHAIANO (P), MORENO (M) and GOMA (G). Alcoholic fermentation: On the inhibitory effect of ethanol.
Biotechnol. Bioeng. 23(1); 1981; 201-11

2490 VERHOFF (FH) and SCHLAGER (ST). Enzyme activity maintenance in packed-bed reactors via continuous enzyme addition.
Biotechnol. Bioeng. 23(1); 1981; 41-60

2491 KARANTH (NG). Some observations on the similarity of batch and plug-flow systems as applied to enzyme reactors.
Biotechnol. Bioeng. 23(1); 1981; 225-30

2492 SISTA (VR) and SRIVASTAVA (GC). Single cell proteins: Its relevance in Indian context.
Indian J. Microbiol. 21(3); 1981; 259-64
Article covers problem of food shortage and need for supply of nutritious food to Indian population; single cell protein (SCP) production, survey of substrate, microorganisms for SCP production, acceptability of SCP (nutritive value, safety for use in the light of toxicity studies), progress made by Indian Institute of Petroleum, Dehradun, in the production of SCP from hydrocarbon, ethanol and molasses. BSN

2493 PAPOUTSAKIS (E), HIRT (W) and LIM (HC). Bacterial utilization of pure and mixed C_1 compounds for single cell protein production.
Biotechnol. Bioeng. 23(1); 1981; 235-42

YEAST

2494 STEWART (GG). The place of yeast in biotechnology.
Indian J. Microbiol. 21(3); 1981; 171-210
Aspects covered include, biotechnology - its definition; areas covered and scope. World scenario in 2000 AD, fermentation products for food and feed industries, production of microbial metabolites definition of yeasts, industrial utilization of yeasts, enzymes of yeasts and recombinant yeasts. BSN

2495 SUBBA RAO (MS). Yeasts and wines.
Indian J. Microbiol. 21(3); 1981; 248-53
Aspects covered include, wine types; factors affecting quality of wine; yeasts present on grapes; characteristics of yeasts for wine fermentation; products of alcohol fermentation; R&D work done in India and in other countries; and future areas of work. BSN

2496 SUBBA RAO (ND). Role of yeast and related factors in brewery fermentation.
Indian J. Microbiol. 21(3); 1981; 254-8
Reviews the history; mode of fermentation in breweries; and problems encountered during fermentation of yeast in breweries. BSN

2497 KIELLAND-BRANDT (MC), GJERMANSEN (C), NILSSON-TILLGREN (T), PETERSEN (JGL), HOLMBERG (S) and SIGSGAARD (P). Genetics of a lager production yeast.
MBAA. Tech. Quart. 18(4); 1981; 185-7

2498 SCHMIDT (JL). Evaluation of a new API 50 CH strip for yeast identification by sugar assimilation.
Ann. Technol. Agric. 29(1); 1980; 47-52 (French)
A new method for the study of sugar assimilation (API 50 CH) was proved for the identification of 151 yeast strains isolated from Camembert cheese. This method can be used instead of standard techniques and it saves a great deal of time. Nevertheless it has not to be employed alone but together with usual microscopic observation, sugar fermentation, sporulation and forming filaments tests for accurate identification of yeasts. AA

2499 JOSIC (D). Quality evaluation of dry yeast.
Getriede Mehl Brot. 34(7); 1980; 179-82 (German)
In the quality evaluation of dry yeast, its raising power and stability are the decisive factors. Various samples of active dry yeast were examined for their raising power, glutathion content, total carbohydrate content, trehalase and also the quantity of

separated (precipitated), low-molecular substance on rehydration at 35 C and 8 C. Whereas changes in oxidised glutathion total carbohydrate, and trehalase content are observed only when there has been a considerable loss of raising power, the change in low molecular substances extracted at 8 C has shown a good correlation with the change in raising power. The measurement of low molecular substances, extracted at 8 C, is a rapid method, which can give an adequate idea of the quality of a sample of dry yeast. KMD

MUSHROOM

2500 KURKELA (R) and VARO (P). Flavour changes in some species of *Lactarius* during cold storage and processing.
Nahrung. 24(7); 1980; 653-61 (German)

The utilization of species of *Lactarius*, which are very abundant, is limited owing to their bitter taste. For this reason the taste of four species (*Lactarius rufus*, *Lactarius terminosus*, *Lactarius trivialis* and *Lactarius necator*) was investigated by means of the descriptive sensory method in the fresh state and after different treatments. The following submodalities were observed in fresh mushrooms: pungent, strongly bitter, sweetish/salty, mushroom like and offensive. All of the heat treatments resulted in the destruction of the pungent taste, associated with an increase of the strongly bitter taste. Frying and microwave heating produced an offensive taste which was also perceived in the blanching water. Cold storage reduced the pungent taste already within one month. The strongly-bitter taste of the mushroom was diminished by blanching, but it was simultaneously observed in the blanching water. The blanching water also contained a salty/sweetish component which did not occur in the fresh mushrooms themselves. The pungent taste was destroyed by salting and fermentation; furthermore, it was not noticed after the reconstitution of dried mushrooms. AA

FOOD ADDITIVES

2501 KHOUDOKORMOFF (B). Evaluation of the mutagenicity of sorbic acid - sodium nitrite reaction products.
Food Cosmet. Toxicol. 19(3); 1981; 405-7

2502 BEUCHAT (LR). Combined effect of solutes and food preservatives on rates of inactivation of and colony formation by heated spores and vegetative cells of molds.
Appl. Environ. Microbiol. 41(2); 1981; 472-7

The combined and independent effects of sucrose, sodium chloride, potassium sorbate, and sodium benzoate on heat inactivation of conidia of *Aspergillus flavus* and *Penicillium puberulum*, ascospores of *Byssochlamys nivea*, and vegetative cells of *Geotrichum candidum* were studied. In addition, the effects of solutes and preservatives on colony formation by unheated and heated conidia of *A. flavus* were evaluated. Increased concentrations of sucrose were accompanied by increased tolerance to heat by *A. flavus*, *B. nivea*, and *G. candidum*. Low concentrations (3 and 6%) of sodium chloride protected *A. flavus* and *G. candidum*, whereas upto 12% sodium chloride protected *B. nivea*, but had little effect on the heat stability of *P. Puberulum*. Potassium sorbate and sodium benzoate acted synergistically with heat to inactivate all four molds. At the same concentration, the two preservatives had varied degrees of effective-

ness on molds and were influenced by the type of solute in the heating menstrua. Heated conidia of *A. flavus* had increased sensitivity to preservatives and reduced water activity, whether achieved by the presence of sucrose or sodium chloride, thus demonstrating heat-induced injury. At the same concentration, potassium sorbate was clearly more inhibitory than was sodium benzoate to colony formation by *A. flavus*, and the presence of sucrose and sodium chloride enhanced this inhibition. AA

2503 HOLLEY (RA). Prevention of surface mold growth of Italian dry sausage by natamycin and potassium sorbate.
Appl. Environ. Microbiol. 41(2); 1981; 422-9

2504 SURAK (JG). Butylated hydroxyanisole-induced changes in lipid synthesis by *Tetrahymena pyriformis*.
J. Food Prot. 43(8); 1980; 603-7

2505 REVIE (GN). The state of the flavour industry more than 50 years ago.
Perfum. Flavor. 6(3); 1981; 50-58

2506 SMITH (MV). Regulation of artificial and natural flavours.
Cereal Food World. 26(6); 1981; 278-80

2507 BADER (P). Natural flavouring materials.
Cereal Food World. 26(6); 1981; 281-3
Topic is discussed under essential oils, fermentation products and heat-processed materials. KAR

2508 MIDDLEKAUFF (RD). Food and colour additives: Where do we go from here?
Cereal Food World. 26(6); 1981; 273-76

2509 KEARSLEY (MW) and RODRIGUEZ (N). The stability and use of natural colours in foods: Anthocyanin, β-carotene and riboflavin.
J. Food Technol. 16(4); 1981; 421-31
Especially at temperatures of over 50 C and on exposure to light, anthocyanins, β-carotene and riboflavin were found to be less stable than their synthetic counter parts-amaranth and tartrazine. pH changes also affected stability of anthocyanin. However, all the three colours were relatively stable to changes in water activity. BSN

2510 GRAHAM (SL), ARNOLD (A), KASZA (L), RUFFIN (GE), JACKSON (RC), WATKINS (TL) and GRAHAM (CH). Subchronic effects of guar gum in rats.
Food Cosmet. Toxicol. 19(3); 1981; 287-90
Guar gum significantly reduced body weights in females of all the treated groups, and in males receiving higher levels (7.5% or 15%) of guar gum in their diet. Utilization of the gum was poor, and, at the 15% level, there was some reduction in bone marrow cellularity. Serum-glucose values and kidney weights were the only parameters showing dose-related effects. KMD

CEREALS

2511 MILLER (BS). Grain dust : What can be done about it?
Cereal Food World. 26(5); 1981; 239-43
After defining what is grain dust and describing its content, the author indicates as to how dust concentration and particle size

distribution may be measured. The prevention of dust cloud formation and the modes of utilization of grain dust have been suggested. KAR

2512 WILLIAMS (PC), THOMPSON (BN), WETZEL (D), McLAY (GW) and LOEWEN (D). Near-infrared instruments in flour mill quality control.
Cereal Food World. 26(5); 1981; 234-7
Ash content was considered as the criterion for flour purity. This article describes the result of determination of ash content using NIR either directly or by measurement of associated factors. KAR

2513 OSBORNE (BG) and DOUGLAS (S). Measurement of the degree of starch damage in flour by near infrared reflectance analysis.
J. Sci. Food Agric. 32(4); 1981; 328-32
The degree of mechanical damage imparted to starch granules during flour milling is of importance in relation to baking properties of the flour. A calibration is presented which enables the degree of starch damage to be measured by near infrared reflectance. The technique is rapid and non-destructive in facilitating quality control of flour mill. KAR

2514 BROBST (KM) and SCOBELL (HD). Chromatographic analysis of sugars in cereals and cereal products.
Cereal Food World. 26(5); 1981; 224-7

2515 WILHELM (E) and KEMPF (W). On the reduction of residual amounts of sulphur dioxide in cereal starches.
Starch. 32(3); 1980; 83-90 (German)
New economically applicable methods for considerable elimination of sulphur dioxide from starch products are described. Extraction experiments show that a part of the SO_2 is chemically bound. The SO_2 content of corn starches can be decreased below 20 ppm by application of less than the stoichiometrically calculated amount of sodium hydroxide or hydrogen peroxide in aqueous solution. Because of the more favourable conditions, the hydrogen peroxide method is preferred to the others. AA

PADDY

2516 ZAKIUDDIN ALI (S) and BHATTACHARYA (KR). High-temperature drying-cum-parboiling of paddy.
J. Food Process. Eng. 4(2); 1981; 123-36
Alternate methods of parboiling of paddy, in place of conventional steam-parboiling, for obtaining improved hydration ability in the parboiled rice were explored, *Ratnachudi* variety, a medium-grained, tall indica, high-amylose rice, was used. The paddy was soaked in warm water to a saturation moisture level (ca 30%, w.b.). The soaked paddy was dried by either exposing it to very hot air (150 - 200 C) or by roasting it in hot sand (250-300 C) for a few minutes. It was observed that under appropriate high-temperature conditions paddy got simultaneously dried and parboiled by both the above treatments. Parboiled rice so produced was examined for appearance (translucence, colour), milling breakage, alkali degradation pattern and starch retrogradation. It was found to be quite comparable to normal steam-parboiled rice in all respects, except that it showed the desirable property of improved hydration ability due to lowering of starch retrogradation. Possible development of the technique into commercial process is indicated. AA

RICE

2517 CHATTAOPADHYAY (PK), HAMANN (DD) and HAMMERLE (JR). Effect of deformation rate and moisture content on rice grain stiffness.
J. Food Process. Eng. 4(2); 1981; 117-21

Grains of brown rice, paddy variety IR-8, were subjected to two types of uniaxial compressive loading, constant displacement rate and sinusoidally varying stress, to determine behaviour over a wide range of time scale. Grains from four different moisture level groups were used. With a time decrease from 120 to 1.6×10^{-4} s the relaxation modulus increased 15, 25, 16 and 20 fold at respective moisture contents of 12, 17, 22 and 27%. A master relaxation curve for each moisture content is presented. Understanding the viscoelastic behaviour of brown rice as a function at time and moisture content is basic to the solution of stress-strain analysis problems. AA

2518 UNNIKRISHNAN (KR) and BHATTACHARYA (KR). Swelling and solubility behaviour of parboiled rice flour.
J. Food Technol. 16(4); 1981; 403-8

Parboiled rice flour swelled and dissolved more than raw rice flour in water at temperatures below 70 C, but less than raw rice at higher temperatures. This difference between raw and parboiled rice increased with an increasing degree of parboiling. A sample of parboiled rice produced by dry-heating soaked paddy in hot sand behaved differently; but when it was wetted and tempered to favour reassociation of starch, its properties fell in line with normal steam-parboiled rice. The above behaviours of raw and parboiled rice flour were similar to those of corresponding whole-grain rice. They also reinforce the earlier suggestion of starch reassociation in conventional parboiled rice. AA

2519 OHASHI (K), GOSHIMA (G), KUSUDA (H) and TSUGE (H). Effect of enclosed.lipid on the gelatinization of rice starch.
Starch. 32(2); 1980; 54-8

Rice starch contains a trace amount of lipid (1%), which alters the characteristics. The effect of the trace amount of enclosed lipid on rice starch gelatinization has been studied by means of amylography, measuring the degree of gelatinization, iodine affinity, iodine colour intensity, solubility and swelling power. Nondefatted starch sample (NDFS), defatted starch (DFS), starch reenclosed with 0.5%, palmitate (RES 0.5%) with fatty acids have been used for this study. NDFS contained about 0.62% of enclosed lipid, while DFS contained about 0.12% lipid. RES with 1.0% palmitic acid contained 0.73% lipid. In the starch lipid interaction, the hydration of starch was restricted, probably due to the hydrophobic interaction between the hydrocarbon chain and the intra-helix spaces of amylose by preventing the entry of water molecules into the granules even when heated. Thus solubility and swelling power were restricted. KMD

2520 MANINGAT (CC) and JULIANO (BO). Starch lipids and their effect on rice starch properties.
Starch. 32(3); 1980; 76-82

The properties of starch lipids and the effect of defatting on properties of starch granules from eight rice varieties were studied. Content of lipids associated with starch prepared by sodium dodecyl benzene sulphonate (DoBS) extraction of protein from rice flour ranged from 0.03 to 0.44%. Major lipids were free fatty acids and lysophosphatidylcholine. Major fatty acids were linoleic palmitic and oleic or myristic acid. Defatting reduced the

gelatinization temperature and the gel viscosity of starch. Various methods of preparation have been compared. AA

2521 ARORA (RC). Utilization of rice milling by products.
East. Econ. 77(17); 1981; 758-9

WHEAT

2522 ZWINGELBERG (H). Polishing of durum wheat with a vertical pearling machine.
Getriede-Mehl Brot. 34(7); 1980; 169-73 (German)
A vertical polishing machine, which is employed in mills for grinding and polishing of grains and legumes, was tried out for the grinding of durum wheat. The quality of the end products, semolina, fines, and flour with regard to yield, speck and ash content depends on the degree of polishing and on the preparation of wheat prior to polishing and grinding. Under standardized conditions of grinding, a polish of about 4% given by a vertical laboratory pearling machine, could increase the semolina yield by about 3%. KMD

2523 NAGAO (S), ENDO (S) and TANAKA (K). Scanning electron microscopy studies of wheat protein fractions from doughs mixed with oxidants at high temperature.
J. Sci. Food Agric. 32(3); 1981; 235-42
Protein from flour and doughs mixed with a Do-Corder at high temperatures in the presence and absence of oxidants (potassium bromate, potassium iodate and L-ascorbic acid) was fractionated according to solubility into water-, salt-, alcohol-, acetic acid-soluble protein fractions and insoluble residue protein. All fractions were freeze-dried and subjected to scanning electron microscopy to observe visually the changes in protein structure. Acetic acid-soluble and insoluble residue protein are alike in structure, but the former was thermally denatured easily, while the latter was very stable to heat treatment. Salt- and alcohol-soluble protein were not deformed, but the water-soluble protein was deformed by heat treatment in the absence of oxidant. Oxidants generally promoted deformation of protein structure with the exception that bromate partly protected acetic acid-soluble protein from deformation. AA

MILLETS

2524 PARAMAHANS (SV) and THARANATHAN (RN). Carbohydrate composition of the millet varagu.
Starch. 32(3); 1980; 73-6
The carbohydrate and lipid compositions of varagu millet have been determined. Starch was the major carbohydrate constituent (~72%) of the polished millet. Aqueous alcohol extraction of the millet yielded fructose, galactose, glucose, sucrose, raffinose and an unidentified component. Alkali extraction of the starch free residue gave hemicelluloses A and B. Hemicellulose A contained glucose with small amounts of rhamnose, arabinose, xylose and mannose; whereas hemicellulose B was composed of glucose and galactose. The alkali-insoluble residue represented cellulose of fibre component as it was exclusively composed of glucose. Linoleic acid was the major fatty acid constituent of the free lipids and palmitic acid was the major fatty acid of the bound lipids. AA

BARLEY

2525 ANON. Barley. A survey on production and marketing.
Profodcil. Bull. 16(1/2); 1981; 50-59
The article covers: Trends in production and productivity of barley in the world and India, its composition and uses, its storage, world trade and marketing. MVG

2526 MORGAN (AG) and GOTHARD (PG). A rapid test for identifying potential malting quality in the early generations of a barley breeding programme.
J. Sci. Food Agric. 32(4); 1981; 333-8

MAIZE

2527 HORN (HE). Corn sweeteners : Functional properties.
Cereal Food World. 26(5); 1981; 219-23
Classification of corn sweeteners; their functionality and composition; extent of sweetness; viscosity and ERH of sweeteners; their colligative properties; fermentability, browning reactions; solubility and crystallization, and the test of corn sweeteners are given. KAR

PULSES

Nil

OILSEEDS AND NUTS

ALMOND

2528 SAURA CALIXTO (F), CANELLAS (J) and BAUZA (M). Soluble carbohydrates in different varieties of sweet almonds (*Prunus amygdalus*).
An. Bromatol. 32(3); 1980; 263-70 (Spanish)
Sucrose and raffinose could be detected in sweet almonds, by paper and thin-layer chromatography. Quantitative analyses carried out on six almond varieties from Mallorca by different methods showed that the total sugar content varied between 4 and 8%. Variety was the factor that determined the quantity of carbohydrates found. KMD

GROUNDNUT

2529 NAGI (HPS) and BHATIA (BS). Preparation of snacks from groundnut variety M-13.
Indian Food Packer. 35(6); 1981; 73-5
Salty snacks were prepared using M-13 variety of groundnut. Bold kernels obtained from decorticated pods were fried in refined groundnut oil and subsequently thoroughly mixed with a salt mixture containing 0.02% BHA and 0.01% citric acid. Besan (Bengal gram flour) coated fried snacks were also prepared. The salted kernels or Besan coated kernels packed in polyethylene bags (300 gauge) could be stored for 4 months at room temperature as the product

retained its good quality and also its crispness. The details of the process for a batch of 20 kg pods have been reported. The cost of the product has been estimated to be Rs. 10.00/kg. BSN

SOYABEAN

2530 FENWICK (DE) and OAKENFULL (D). Saponin content of soyabeans and some commercial soyabean products.
J. Sci. Food Agric. 32(3); 1981; 273-8
Saponins were present in all the materials and it ranged from 56 g/kg^{-1} (on dry weight basis) for whole soyabeans to 3 g/kg^{-1} for the protein isolate. KAR

2531 LILLFORD (PJ) and WRIGHT (DJ). Influence of isoelectric precipitation on the solubility of soyabean proteins.
J. Sci. Food Agric. 32(4); 1981; 315-27
Two processes of protein insolubilization were noted. One termed as 'pH sensitivity' involved principally haemagglutinin and low molecular weight (2S) proteins and was affected by exposure to low pH (4.5) in the presence of reducing agents; resolubilization could be achieved by adjusting the pH to 7.6, but only at low ionic strength. The second process concerned a precipitation induced aggregation of the globulins which was produced in the absence of, and largely eliminated in the presence of reducing agent. In this case, complete solubilization was afforded by readjustment of the pH to 7.6, but was not dependent on the presence of reducing agent. KAR

COTTON SEED

2532 MILNER (M). Guideline for edible cottonseed protein flours and related products.
Food Nutr. Bull. 2(3); 1980; 51-54

SUNFLOWER SEED

2533 PALANIVEL (S) and RAMANATHAN (KM). Investigations to study the effect of NPK on thousand seed weight and seed yield of sunflower seed.
Oils Oilseeds J. 33(10); 1981; 26-7

2534 SCIANCALEPORE (V) and De GIGLIO (A). The content and composition of free and esterified sterols in sunflower seed oil.
Ind. Aliment. 19(173); 1980; 503-6 (Italian)
The content and composition of free and esterified sterols in five different cultivars of *Helianthus annuus* were determined, using direct preparative TLC of the oil followed by GLC with cholesterol as an internal standard. The content of free sterols was 0.24-0.30% and that of esterified sterols 0.11=0.28% of the oil. Although qualitatively the same sterols were obtained in two fractions, the composition of free sterols was remarkably different from that of the esterified sterols. The esterified fraction was characterized by high percentage of Δ^7-sterols and Δ^5-avenasterol. Also the fatty acid composition of sterol esters was remarkably different from that of total fatty acids. The sterol-bound fatty acid composition was characterized by low percentages of 20:0 and 22:0. Little or no varia-

tion in free and esterified sterols as well as in total and sterol bound fatty acids was observed for the five cultivars. AA

POPPY SEED

2535 HOLASOVA (M) and BLATTNA (J). Lipolytic activity of poppy seed.
Nahrung. 24(7); 1980; 607-13

Crude lipase emulsion from poppy seed hydrolyses its endogenous substrate at an optimum pH of 4.9 and optimum temperature of 22-25 C. The lipase emulsion is stable up to 50 C. The enzyme is activated by low concentration of calcium ions; at higher concentrations a partial activity drop occurs. The addition of sodium chloride decrease the lipase activity, whereas casein, whey, and bovine serum albumin stimulate its activity. The addition of sucrose does not affect the activity. During the enzymic reaction, triglycerides are hydrolyzed yielding diglycerides, free fatty acids, and to a lesser extent, monoglycerides as well. AA

TUBERS AND VEGETABLES

2536 SUMATI MUDAMBI (R), RAJAGOPAL (MV) and USHA VARKI. Ascorbic acid loss in vegetables during hostel service.
Indian Food Packer. 35(6); 1981; 51-7

The losses in ascorbic acid content of vegetable salads and cooked vegetables as served in a University hostel when held over a period of three and a half hours were determined. Losses in ascorbic acid ranged from 9 to 53% in salads and from 8 to 59% in cooked vegetables. The average ascorbic acid content of the vegetables per serving was 10.2 mg at the beginning and 6.5 mg at the end of the service. Losses in cooking of certain ascorbic acid rich vegetables during institutional cooking was found to range from 67 to 82%. Incorporation of vitamin C rich vegetables such as drumstick and fenugreek leaves in the diet increased the average vitamin C content of the vegetables per serving to 22.3 mg at the beginning and to 13.3 mg at the end of the serving period. AA

CARROT

2537 VAIDEHI (MP) and VIJAYAKUMARI (J). Eating quality of selected Indian dishes with carrot leaves.
Lal-Baugh. 26(4); 1981; 65-77

2538 SAMPATHU (SR), CHAKRABORTY (S), KAMAL PRAKASH, BISHT (HC), AGARWAL (MD) and SAHA (NK). Standardization and preservation of *carrot halwa*. An Indian sweet.
Indian Food Packer. 35(6); 1981; 60-67

Standardization of a recipe and preservation technique for *carrot halwa* have been reported, as the market samples examined showed significant variation in proportion of ingredients and quality of the product. Rancidity was not noticed in canned *carrot halwa* even after 12 months of storage. Heat penetration tests showed that for 1 lb jam cans, about 75 minutes of thermal processing time is required for the can centre temperature to attain 245 F at a retort temperature of 250 F and initial temperature of 190 F. Pretreatment of ingredients - sugar and carrot, to reduce microbial load gave *carrot halwa* which on processing in cans for 40 minutes at 250 F or for 60 minutes in boiling water could be

preserved after filling hot (200 F) for 1 year. Almost, a sterile product could be obtained by this method, as evidenced from bacteriological sterility tests conducted after incubation at 33 C and 55 C. BSN

POTATO

2539 JONES (PG) and FENWICK (GR). The glycoalkaloid content of some edible solanaceous fruits and potato products.
J. Sci. Food Agric. 32(4); 1981; 419-21
The glycoalkaloid contents of three edible solanaceous fruits (aubergine, red and green peppers) have been found to be less than 10 mg 100 g^{-1} fresh weight. Commercial potato products, such as potato crisps, chips and tinned new potatoes, have been found to contain similar low levels which are within those accepted as safe by breeders of commercial potatoes. AA

2540 McLAIN (HD) and McKAY (G). Quality of fluidisation of potato chips.
Irish J. Food Sci. Technol. 5(1); 1981; 13-21

CASSAVA

2541 CARANSA (A). Simplified economical cassava starch process.
Starch. 32(2); 1980; 48-54
In consultation with the Royal Tropical Institute in Amsterdam (The Netherlands), a simplified cassava starch flowsheet was developed. The equipment is suitable for skid-mounting which would make it possible to move the plant to another harvesting site, when desired. After peeling, washing and disintegration of the tubers the fruit-water is removed in solid bowl centrifuges. The fibres are removed on a small battery of DSM-screens; pre-dewatering of the fibers takes place only when local circumstances require this. The crude, screened starch milk is degritted, concentrated and purified in a counter-current hydrocyclone washing system, with a small amount of fresh water. AA

2542 OLORUNDA (AO), AWORTH (OC) and NUMFOR (FA). Predicting quality of cassava products with the aid of chemical and rheological properties.
J. Food Technol. 16(4); 1981; 447-50
It was observed that amylose content and amylographic peak viscosity of cassava starch were related to subjectively evaluated meatiness. Further, meatier cassava cultivars showed higher amylose content and slightly higher amylograph peak viscosity and produced most acceptable gari. BSN

YAM

2543 EMIOLA (LO) and DELAROSA (LC). Physicochemical characteristics of yam starches.
J. Food Biochem. 5(2); 1981; 115-30

LEAFY VEGETABLES

2544 PUTTASWAMY and REDDY (DNR). *Spodoptera Litura* F (Lepidoptera Noctuidae). A pest of leafy vegetables.
Curr. Res. 10(4); 1981; 62

SPINACH

2545 PALLOTTI (G), BENCIVENGA (B), COLAIORI (G), CONSOLINO (A) and PORROZZI (G). Nitrites in fresh and frozen vegetables during storage.
Ind. Aliment. 19(173); 1980; 495-8 (Italian)
Frozen vegetables (Spinach and brocoli) were stored at room temperature and at 4 C and nitrites were checked daily. Electric black-out was simulated during two months (12 hours every day), as a result of which nitrites could not be detected. Spinach, both fresh and frozen, cooked with water in different ratios were stored at room temperature and at 4 C. In normal and recommended conditions nitrites were not detected. AA

TOMATO

2546 CABIBEL (M) and FERRY (P). Evolution of carotenoids in tomatoes as a function of ripeness levels and cultural conditions.
Ann. Technol. Agric. 29(1); 1980; 27-45 (French)
The effects of three cultural methods : glass and plastic greenhouse, field, as also the place of the fruit on the plant, the evolution of carotenoids content of the tomato variety $H6_{3-5}$ were investigated. Lycopene and β-carotene may be used as testing parameters for differentiating physiological steps of tomato ripeness. These factors do not have any impact on evolution of the two varieties. BSN

2547 DONGOWSKI (G), BOCK (W), MARKOVIC (O) and SLEZARIK (A). The effects of molecular parameters of the galacturonan substrate on the activity of a polygalacturonase from tomatoes.
Nahrung. 24(7); 1980; 619-26 (German)

ROCKMELON

2548 MUTTON (LL), CULLIS (BR) and BLAKENEY (AB). The objective definition of eating quality in rockmelons (*Cucumis melo*).
J. Sci. Food AGric. 32(4); 1981; 385-91
From a set of 12 factors thought to be related to eating quality, only percentage soluble solids and penetrometer estimates of flesh firmness were useful in deriving a predictive equation. A practical grade standard might be 10% minimum solids with upper and lower limits for flesh firmness of 2.0 and 1.0 kg force. AA

FRUITS

2549 KAPUR (OP) and NAGARAJA (KV). Quality parameters of export oriented fruit and vegetable products.
Indian Food Packer. 35(6); 1981; 20-28

Aspects discussed include: pineapple juice, slices and titbits; USSR exports; irrelevant specifications; canned mango pulp, juice and slices; USSR specifications for pineapple jam and stewed fruits; varigated parameters; uniform national standard; metallic contaminants; and no-zinc-free product. BSN

2550 GEESON (FD). Cool storage of fruit and vegetables.
Food Flavour. Ingred. Packag. Process. 3(9); 1981; 11-5
Discusses : causes of deterioration; storage environment and its control; ice-bank cooling; and controlled atmosphere storage. BSN

SAPOTA

2551 INGLE (GS), KHEDKAR (DM) and DABHADE (RS). Ripening studies in sapota fruit (*Achras sapota* Linn).
Indian Food Packer. 35(6); 1981; 42-5
During the ripening process, there was increase in sugars and decrease in acidity and phenolics. Among the different media used for ripening, paddy straw had accelerated ripening with all desirable changes in the fruits. Fruits ripened in paddy straw had maximum organoleptic score. AA

CHERRY

2552 KONIG (R), BECKMANN (G) and LAUTERBACH (K). Lead and cadmium contents of sour cherries in the industrial processing after mechanical harvest.
Nahrung. 24(7); 1980; 673-5
The authors deal with the contamination of sour cherries by lead and cadmium. About 1 kg of sour cherries were washed and homogenized. Around 10 g of the homogenates were decomposed by means of perchloric acid/nitric acid. Cadmium and lead were determined by inverse voltametry when the Pb and Cd contents were 41.9, 6.1 µg/kg in samples, which were not washed and 28.2, 3.2 µg/kg in washed samples. In the Federal Republic of Germany the standard values for fruit are 500 µgPb/kg and 50 µgCd/kg. The samples studied by the authors cannot be considered as contaminated since their Pb and Cd contents were much less. KMD

PEACH

2553 BAL (JS) and CHOHAN (GS). Biochemical changes in development of Flordasun peach.
Indian Food Packer. 35(6); 1981; 46-50
The fruit of Flordasun peach took eleven weeks to reach the stage of harvest maturity from the time of setting. The growth in terms of length and diameter showed three rapid growth phases: (i) upto 28 days, (ii) between 35 and 56 days and (iii) 63 days and onwards and two slow growth phases, i.e., (i) between 28 and 35 days and (ii) between 56 and 63 days. The trend of increase in weight of fruit was similar to that in length and diameter. The pattern of increase in the length, diameter and fruit weight followed a double sigmoid curve. The fruits were green in the earlier stage, and changed to pinkish colour with red tinge at harvest stage. Specific gravity of the fruit decreased continuously from fruit set till final harvest. The stone development proceeded at a fast pace upto 44 days, and the increase was almost negligible

till fully ripe stage. The total soluble solids in the pulp were found to increase with a corresponding decrease in acidity. There was no specific trend in ascorbic acid content during fruit development. The general pattern of increase in the percentage of both total and reducing sugars has been found to be similar. AA

OLIVE

2554 GUZMAN CHOZAS (M), BAUTISTA PALOMA (FJ) and GARRIDO FERNANDEZ (A). Assay of ferrous gluconate in Spanish table olives.
An. Bromatol. 32(3); 1980; 299-302
A direct spectrophotometric assay is suggested to determine whether ferrous gluconate has been used in the processing of ripe olives; the method is based on the formation of a Cu(II) - gluconate complex (λ_{max} = 660 nm). When applied to the Sparish olive variety "carrasquenas", a good reproducibility and a satisfactory recovery were attained. KMD

2555 BRIGHIGNA (A) and PELAGATTI (O). Preparations of lactic fermentations for table olives with spray drying.
Ind. Aliment. 19(173); 1980; 499-502 (Italian)

APPLE

2556 SAURA CALIXTO (F) and BERMEJO (J). Volatile components of cider and table apples.
An. Bromatol. 32(3); 1980; 281-8
The volatile components of cider apples and table apples have been analysed by gas chromatography. About 100 different, volatile substances were detected in cider apples. The higher acidity of cider apples, combined with their abundance of alcohols, leads to the formation of a large number of esters; esters occur with greater frequency in the wide range of volatile components of cider apples than is the case with table apples. KMD

2557 HOPKIRK (G) and WILLS (RBH). Metabolism of lipids applied to apples to reduce soft scald and their effect on respiration and ethylene production.
J. Food Biochem., 5(2); 1981; 131-8
Methyl esters were applied to the surface of apples and when the lipids were extracted from the fruit after four weeks of cool storage it was found that, while each methyl ester was metabolised to some extent to non-lipid compounds, there was minimal incorporation of applied methyl ester into other lipid fractions such as glycerides or phosopholipids. Methyl esters also enhanced the metabolism of (^{14}C)-fatty acids to nonlipid compounds. Methyl stearate and lecithin reduced the rate of ethylene production, while methyl linoleate and methyl oleate had no significant effect but no compound significantly changed the rate of respiration. The principal action of methyl esters and other lipids in reducing scald is considered not to be due to their effect on lipid composition, but rather on the amount of hexanol in the fruit. AA

PEAR

2558 DHILLON (BS), SOHAN SINGH and RANDHAWA (JS). Storage behaviour of treated LeConte pear.
Indian Food Packer. 35(6); 1981; 34-6;

The effect of various treatments (i) wax emulsion 4%, dipping for 10 minutes, (ii) wax emulsion 8%, dipping for 10 minutes, (iii) gibberellic acid 100 ppm, dipping for 10 minutes (iv) gibberellic acid 200 ppm, dipping for 10 minutes, (v) calcium chloride 4%, dipping for 30 minutes, (vi) calcium chloride 6%, dipping for 30 minutes, (vii) chlorocholine chloride (CCC) 2000 ppm, dipping for 10 minutes and (viii) CCC 4000 ppm, dipping for 10 minutes on the shelf life of Le Conte pear stored at room temperature (30 C) have been studied. Based on data obtained for appearance, loss in weight, spoilage, total soluble solids, total titratable acidity and reducing sugar percentage, fruits treated with (ii) showed the best behaviour during storage as the fruits showed best retention of general appearance, dessert quality and least loss in weight and in physiological disorders. BSN

GUAVA

2559 KALRA (SK) and REVATHI (G). Storage studies on guava (*Psidium guajava* L.) pulp.
Indian Food Packer. 35(6); 1981; 29-33

Guava pulp from cv. Allahabad Safeda (V_1) and Lucknow-49 (V_2) was stored in 5 kg containers of porcelain, glass and PVC containing 800 ppm of SO_2 and kept at room and cold temperature. The pulp was analysed for titrable acidity, vitamin C, TSS, reducing and non-reducing sugars, protein, pH and SO_2 level at 15-day interval for 45 days. There were significant variations in most of the chemical characteristics during storage of pulp. Protein, acidity and TSS showed an upward trend and SO_2 level declined during storage of the guava pulp. Vitamin C content was higher in V_2 compared to V_1, but the former was slightly less suitable for storage. Porcelain containers were inferior to the other two containers for storage of the guava pulp. Under refrigeration, the pulp stored much longer as against at room temperature. After six months, the pulp was utilized for preparation of juice which was of good quality. AA

SUGAR, STARCH AND CONFECTIONERY

2560 HEYNS (K) and FELDMANN (J). Chemical reactions and derivatisations of unsaturated sugars. Part 1 and 2.
Starch. 32; 1980; (2) 40-47 and (3) 92-8 (German)

Intensive study on the conversions of sugars with components containing nitrogen has paved the way to numerous interesting techniques of synthesis. Important initial materials for the organochemical synthesis are anhydrous sugar unsaturated sugars, and polyalcohols and acids obtained by simple oxidation reactions. The reactions and the derivatisations in the important conversions have been summarized. Examples on the application of unsaturated carbohydrates in this syntheses have been given. KMD

2561 RASPER (VF). Analysis and testing of nondigestible polysaccharides.
Cereal Food World. 26(5); 1981; 228-32

2562 DUFF (M). How to use cellulose.
Food Manuf. 56(4); 1981; 45

2563 STEWART (JC) and PARRY (JB). Factors influencing the production of cellulase by *Aspergillus fumigatus* (Fresenius).
J. Gen. Microbiol. 125(Pt.1); 1981; 33-9

2564 NEUMARKT (T) and SZEJTLI (J). High resolution electron micrographs of crystalline beta-cyclodextrine.
Starch. 32(3); 1980; 90-91

2565 DELPEUCH (F) and FAVIER (JC). Characteristics of starches from tropical food plants : Alpha-amylase hydrolysis, swelling and solubility patterns.
Ann. Technol. Agric. 29(1); 1980; 53-67 (French)
Alpha-amylase hydrolysis, swelling and solubility patterns were studied on thirty starches from tropical plants of various genus species and varieties. Large differences were observed in alpha-amylase hydrolysis, swelling and solubility patterns between the different genus and species and at times between varieties of the same species. The results were compared with those obtained with maize starch and potato starch. Relationships between the characteristics studied and the size of starch granules, the amylose content and the crystalline organization type were discussed. Generally, it seems that starches with small granules and with a low amylose content are more sensitive to alpha-amylase action than the other starches and have the lowest solubilization rate when compared to the swelling rate. AA

CONFECTIONERY

2566 FOX (H). Confectionery packages in the USA. Westpack 81.
Confect. Prod. 47(6); 1981; 293

2567 RAYMOND (C). Automated bar wrapping and packaging line.
Manuf. Confect. 61(6); 1981; 75-6

2568 PAULICKA (FR). Non-lauric substitute and replacer confectionery coating fats.
Manuf. Confect. 61(6); 1981; 59-64

2569 LANING (SJ). Lauric fats for the confectionery industry.
Manuf. Confect. 61(6); 1981; 52-3, 56

CHOCOLATE

2570 BIXLER (R). Controlling the quality of imported semi-finished chocolate products.
Manuf. Confect. 61(6); 1981; 45-50

2571 ALTVATER (F). Technology for the manufacture of candy bars and assorted boxed chocolate centers.
Manuf. Confect. 61(6); 1981; 67-72

BAKERY PRODUCTS

BREAD

2572 TSEN (CC). Microwave energy for bread baking and its effect on the nutritive value of bread : A Review.
J. Food Prot. 43(8); 1980; 638-40

2573 BRUMMER (J-M), SEIBEL (W) and STEPHAN (H). Effect of L-cysteine-hydrochloride and L-cystine in the manufacture of bread and rolls.
Getriede Mehl Brot. 34(7); 1980; 173-8 (German)
The use of aminoacids L-cysteine and L-cystine does not result in any improving effect in wheat flours that are "not suitable for bread production". The technological effects of L-cysteine hydrochloride in wheat bread decrease with increasing rye content. L-cystine acts like ascorbic acid. In typical, German wheat varieties, it exerts a less intensive influence than vitamin C. As in the case of cysteine, the technological effect of cystine too cannot be achieved by using special processing steps. The effect of cystine can reduce or eliminate excess use of ascorbic acid. L-cysteine exhibits a lower water solubility than the cysteine salt. KMD

2574 KOIVURINTA (J), KURKELA (R) and KOIVISTOINEN (P). Bread baking properties of Pekilo, a microfungus biomass from *Paecilomyces varioti*.
Nahrung. 24(7); 1980; 597-606
Pekilo increased the water binding of the dough from about 62% to approximately 72%, when the flour substitution level was raised from 0 to 8%. Pekilo had a negative effect on the stability and extensograph properties of the dough and this effect was augmented when the amount substituted was increased. The mild taste of Pekilo powder was distinctly observed in bread even with the lowest substitution levels. Soyafluff 200T and Torutein were used as reference materials in wheat bread experiments. AA

2575 CASUTT (VJ), MEREDITH (P) and MITCHELL (TA). An assessment of the rapid batter expansion test for prediction of bread baking quality in New Zealand conditions.
J. Food Technol. 16(4); 1981; 433-6
As a test for prediction of baking quality, rapid batter expansion test did not prove of any value as compared to a baking by a mechanical dough development for a range of thirty five New Zealand wheats milled by quadrumat mill and of fourteen commercial flours. BSN

CRACKER

2576 BALASUBRAMANYAM (N), INDIRAMMA (AR), BALDEV RAJ and ANANDASWAMY (B). Evaluation of shelf-life of packaged salty biscuits (crackers).
Indian Food Packer. 35(6); 1981; 14-9
Humidity-Moisture relationship studies of crisp salty biscuits (crackers) have indicated that a moisture content of about 7.0% (DWB) is critical with respect to the loss of crispness of the product. Storage studies of the product in different flexible packaging materials have revealed that it keeps well over 100 days in

300 MXXT cellophane and 300 gauge high density polyethylene (HDPE) film pouches under the storage condition of 65% RH and 27 C. A simple and rapid method of evaluating the shelf-life of the product under normal storage atmosphere by making use of sorption characteristics and accelerated storage tests has been discussed. AA

MILK AND DAIRY PRODUCTS

2577 MULLER (LL). Food odyssey - 2001. Dairy products.
Food Technol. Aust. 33(6); 1981; 278-81
This pertains to Australia only. KAR

MILK

2578 HARGROVE (GL), MBAH (DA) and ROSENBERGER (JL). Genetic and environmental influences on milk and milk component production.
J. Dairy Sci. 64(7); 1981; 1593-7

2579 ZALL (RR) and CHEN (JH). Heating and storing milk on dairy farms before pasteurization in milk plants.
J. Dairy Sci. 64(7); 1981; 1540-44

2580 FOX (PF). Heat stability of milk: Significance of heat-induced acid formation in coagulation.
Irish. J. Food Sci. Technol. 5(1); 1981; 1-11

2581 BERGER (W), DANIEL (E), LUTHER (H) and MAUNE (R). Contributions to the production of casein threads.
Nahrung. 24(7); 1980; 633-44 (German)

2582 VIDON (DJM) and DELMAS (CL). Incidence of *Yersinia enterocolitica* in raw milk in Eastern France.
Appl. Environ. Microbiol. 41(2); 1981; 355-9

2583 ANON. Condensed milk. The vital ingredient.
Confect. Prod. 47(6); 1981; 294, 296-7

YOGURT

2584 BRAY (F). Yogurt and ice cream.
Ind. Aliment. 19(173); 1980; 473-6 (Italian)
The author compares the affinities between yogurt and ice cream as products and also from the view point of processing. Basic formulations for the production of yogurt-ice cream are given. AA

BUTTER

2585 SYNNOTT (EC). Power variation during working of butter in a biconical churn.
Irish J. Food Sci. Technol. 5(1); 1981; 49-58

CHEESE

2586 ITO (Y), TOYODA (M), OGAWA (S) and IWAIDA (M). Comparison of two methods to determine sorbic acid in cheese.
J. Food Prot. 43(8); 1980; 601-2
A combined solvent-extraction/gas-liquid chromatography (GLC) method was compared with the A.O.A.C. method of sorbic acid estimation in cheese. On the whole, A.O.A.C. method resulted in higher values (98.6 - 135.9%). Probably, substances other than sorbic acid might have reacted with 2-thiobarbituric acid to develop colour. The results of the GLC method ranged from 97.5 to 106.2% of the theoretical values. The difference between the two sets of results was significant at 5% for the cheese lot containing 72.5 ppm of sorbic acid. Other advantages of the GLC method are rapidity, simplicity and accuracy. KMD

MEAT AND POULTRY

2587 KALWEIT (W). Cooking kettle installations.
Fleisch. 33(6); 1979; 111-2 (German)

2588 ARNOLD (H). Reconstruction of a deboning plant by using machines produced in the GDR.
Fleisch. 33(6); 1979; 112-3 (German)

2589 MEYER (E). Disinfection of handling equipment in flaying houses using peracetic acid.
Fleisch. 33(6); 1979; 117-8 (German)
Before disinfecting the surfaces, they were coated with corrosion resistant paints. It was shown that 0.3% peracetic acid used, was sufficiently effective with a time of action of 10 minutes. Earlier the experimental surfaces were cleaned with a jet of water. This type of disinfection termed as "running disinfection" is recommended in flaying houses. VR

2590 KRENKEL (K) and OELKER (P). Some aspects of the strain measurement of a reconstituted meat product.
Fleisch. 33(6); 1979; 113-4 (German)

2591 WASMUND (M) and WOLF (E). Use of protective gloves without hygienic risk.
Fleisch. 33(6); 1979; 104 (German)

2592 BRYAN (FL), McNAUGHT (K) and BLEHM (K). Time-temperature survey at a restaurant that specializes in barbecued food.
J. Food Prot. 43(8); 1980; 595-600

2593 RAYMAN (MK), ARIS (B) and HURST (A). Nisin : A possible alternative or adjunct to nitrite in the preservation of meats.
Appl. Environ. Microbiol. 41(2); 1981; 375-80
It was observed that a combination of 40 ppm nitrite and either 75 or 100 ppm of nisin almost completely inhibited growth of *Clostridium Sporogenes* PA 3679 spores in meat slurries, which had been heated to simulate the process used for cooked ham. ESN

2594 MOLLER (AJ). Analysis of Warner-Bratzler shear pattern with regard to myofibrillar and connective tissue components of tenderness.
Meat Sci. 5(4); 1981; 247-60

Force-deformation curves from the Warner-Bratzler (WB) shear device were used to evaluate specific changes in the myofibrillar (WB M-force) and connective tissue component (WB C-force) of tenderness in samples from beef semitendinosus. Cores were heated in a water bath to end point temperatures of 60 C and 80 C by using combinations of slow and fast heating rates. Increasing the end point temperature from 60 C to 80 C was found to increase the WB M-force and to decrease the WB C-force, whereas the WB peak force was least affected. Comparisons between different heating rate combinations to samples heated to 80 C showed that the WB M-force was affected by a heating rate both below and above 60 C, while the WB C-force was most influenced by a heating rate about 60 C. Slower heating rates and higher end point temperatures resulted in greater cooking losses and increased solubility of collagen. The WB M-force and WB C-force were found to be more significant estimators of sensory evaluations of tenderness and collagen solubility in this experiment than the usually measured WB peak force. AA

2595 HORGAN (DJ). Effect of pressure treatment on the sarcoplasmic reticulum of red and white muscles.
Meat Sci. 5(4); 1981; 297-305

2596 KOPP (J) and VALIN (C). Can muscle lysosomal enzymes affect muscle collagen post-mortem?
Meat Sci. 5(4); 1981; 319-22

2597 CANTONI (C), PALEARI-BIANCHI (MA) and PROVERBIO (E). Behaviour of nitrite and nitrate in the animal organism.
Ind. Aliment. 19(173); 1980; 491-4 (Italian)

2598 KORMENDY (J) and ERDOS (Z). Quasi-linear programme of determination of the optimum composition of sausages.
Fleisch. 33(6); 1979; 115-6 (German)

BEEF

2599 PARISI (E) and JULINI (M). Frauds in the retail trade of bovine meat.
Ind. Aliment. 19(173); 1980; 483-8 (Italian)

2600 POCIUS (PA), CLARK (JH) and BAUMRUCKER (CR). Glutathione in bovine blood:. Possible source of amino acids for milk protein synthesis.
J. Dairy Sci. 64(7); 1981; 1551-4

2601 CROSS (HR), WEST (RL) and DUTSON (TR). Comparison of methods for measuring sarcomere length in beef *Semitendinosus* muscle.
Meat Sci. 5(4); 1981; 261-6

The objective of the study was to compare the precision of the laser method for measuring sarcomere length with the precision of two oil-immersion microscope methods. Eighteen *semitendinosus* muscles were assigned to one of three post-mortem treatments to provide a wide range in sarcomere length. Two 5.0 cm sections were removed from the centre of each muscle. Each section was subdivided into six equal-size pieces and randomly allotted to each of three participating institutions. Analysis of variance revealed that sarcomere length measurement was not significantly affected by the method of measurement or by the technician. For

99% precision, the laser method required 34 measurements, whereas the two microscopic methods required 45 and 66 measurements, respectively. AA

2602 HEDRICK (HB), KRAUSE (GF), ELLERSIECK (MR), EPLEY (RJ), RILEY (JC) and THOMPSON (GB). Beef carcass composition as influenced by yield and quality grade.
J. Anim. Sci. 53(1); 1981; 102-6

2603 DRANSFIELD (E) and JONES (RCD). Relationship between tenderness of three beef muscles.
J. Sci. Food Agric. 32(3); 1981; 300-304
This study reports the relationship between mechanical properties of cooked samples of *Musculus longissimus dorsi*, *M. semitendinosus*, and *M. semimembranosus* from 166 commercial beef animals. KAR

2604 FISHER (AV), HARRIES (JM) and ROBINSON (JM). Sensory assessment of fatness and conformation of beef steers.
Meat Sci. 5(4); 1981; 283-95

2605 MACFARLANE (JJ), McKENZIE (IJ), TURNER (RH) and JONES (PN). Pressure treatment of meat : Effects on thermal transitions and shear values.
Meat Sci. 5(4); 1981; 307-17

2606 O'KEEFEE (M) and HOOD (DE). Anoxic storage of fresh beef. 2. Colour stability and weight loss.
Meat Sci. 5(4); 1981; 267-81
Storage variables, such as age of meat, temperature and humidity of storage, and commercial preparation of meat, were evaluated for their effects on the colour stability and weight loss of fresh beef packaged in anoxic gas atmospheres. Apart from age of meat post mortem, increasing storage temperature has the most marked effect on reducing colour stability and increasing weight loss. Temperature effects on colour stability and weight loss for individual muscles have interesting similarities; the extent of the temperature effect on both these qualities of meat is *M. psoas major* > *M. gluteus medius* > *M. semimembranosus*. The significance of such similarities in terms of differing physical and biochemical characteristics of muscles is discussed. AA

2607 FLYNN (A) and FOX (PF). Proximate and mineral composition of tripe and drisheen.
Irish J. Food Sci. Technol. 5(1); 1981; 65-9

2608 RYAN (TC), GRAY (IJ) and MORTON (ID). Oxidation of cholesterol in heated tallow.
J. Sci. Food Agric. 32(3); 1981; 305-8
Preliminary TLC and GC data indicate that tallow cholesterol is oxidised when tallow is exposed to high temperatures (180 C) for an extended period. KAR

PORK

2609 BONNEAU (M), DESMOULIN (B), FROUIN (A) and BIDARD (JP). The effect of processing boar meat on androstenone concentrations in fat.
Ann. Technol. Agric. 29(1); 1980; 69-73 (French)
Cooked hams and dry sausages have been processed individually from pork of 29 young boars. Fat androstenone concentration has

been measured by radioimmunoassay first in pork and then in hams and sausages. Mean androstenone concentration is more reduced after cooking (-46 p. 100 of initial content for ham) than after maturation (-23 p. 100 for dry sausage). As decrease of androstenone content is positively related to initial concentration (r = + 0.89 to + 0.93) the variability of steroid measurements is reduced after processing. So, partial disappearance of androstenone is propitious to a better acceptability of boar meat after processing. AA

2610 BELLO (J), RIPOLL (J) and LARRALDE (J). Application of model systems in the study of the quality of meat emulsions. 3. Role of the soluble proteins of pork shoulder blade in emulsion stability.
An. Bromatol. 32(3); 1980; 249-62

The influences of the amount of soluble protein in the emulsion, the speed of mixing, the final temperature of the emulsion, and the amount of oil initially added on emulsion stability (ES) were studied. It was found that ES depends upon the volume of the discontinuous phase; on the temperature which in extreme cases can destroy the emulsion due to protein denaturation; and on the presence of anions and cations which alter the electrostatic balance of the protein molecule and affect the ES positively or negatively. The influence of papain-treated pork protein on ES has also been studied. KMD

2611 ROBERTS (TA), GIBSON (AM) and ROBINSON (A). Prediction of toxin production by *Clostridium botulinum* in pasteurized pork slurry.
J. Food Technol. 16(4); 1981; 337-55

The factors studied in combination on the model pork system for controlling growth of *Clostridium botulinum* types A & B were: Sodium chloride, (2.5, 3.5, 4.5 % w/v on water); sodium nitrite (100, 200, 300 µg/g); sodium nitrate (0, 500 µg/g); sodium isoascorbate (0, 1000 µg/g) polyphosphate (curaphos 700, 0, 0.3% w/v); heat treatment (none, 80 C/7 min, 80 C/7 min + 70 C/1 hour); at two pH levels and stored at 15, 17.5, 20 or 35 C. Analysis of data of the statistical model resulted in two formulae (for 'low' and 'high' pH slurries) which probably aid in estimation of the probability of toxin production in the pork slurry systems. BSN

CHICKEN

2612 DEVARAJAN (S). Profitability of broiler production in the environs of Coimbatore city.
Poult. Guide. 18(9); 1981; 35-8

2613 MORENO (B) and CALLES (A). Procaine penicillin G residues in the muscle, kidneys, and liver of chickens inoculated with therapeutic doses of this antibiotic.
An. Bromatol. 32(3); 1980; 207-14 (Spanish)

Procaine penicillin G was injected intramuscularly into chickens, in doses of 5,000, 10,000, 20,000 and 100,000 IU/kg live weight and the amount of this antibiotic present in the muscle, kidneys, and liver was measured after intervals of 2, 12, 24, and 48 hours. Residues were initially higher in the kidneys than in liver and muscle. The lowest concentrations were observed in the muscle at all times. 48 hours after inoculation, the residues were less than 0.0625 IU/kg in all tissues, when the three lower doses had been administered. These results have been discussed from

the standpoint of potential risk to human health, and tolerances and withdrawal times have been recommended. KMD

2614 THOMAS (CJ) and McMEEKIN (TA). Spoilage of chicken skin at 2 C: Electron microscopic study.
Appl. Environ. Microbiol. 41(2); 1981; 492-503
Microscopic techniques were used in conjunction with normal microbiological procedures to examine the development of the spoilage microflora on the skin of chicken carcasses held at 2 C. Pigmented and nonpigmented psychrotrophic pseudomonads were the major spoilage bacteria isolated at all stages of storage examined. The spoilage microflora grew within a liquid film covering the skin surface, as well as in feather follicle shafts. Penetration and disruption of skin tissue were not observed even after onset of organoleptic spoilage. Bacteria were not attached to the skin by extracellular bridging substances. These data suggest a nonspecific histological-microbiological relationship between the spoilage association and the skin substrate. AA

GUINEA FOWL

2615 VERMA (SVS). Guinea fowl : A promising avian species of the future.
Poult. Guide. 18(8); 1981; 39-40
Guinea fowl grow a little slower than chickens, attaining a live weight of 1.2-1.4 kg at 14 weeks. The females begin laying in the 31st week; they lay 146 eggs during the first year, and 120 eggs during the second. The initial egg weight of 35-40 g, may rise to an average of 46 g after one month. The flesh is considered a delicacy, and commercial Guinea fowl farms have come up in France and the U.K. KMD

EGG

2616 SHUAIB (ACA), BESWICK (G) and TOMLINS (RI). The thiocyanate ion (SCN^-) content of eggs from hens (*Gallus domesticus*) fed on a diet containing rapeseed meal.
J. Sci. Food Agric. 32(4); 1981; 347-52
Rapeseed meal (RSM) was incorporated in layer's diet to find out whether there is any effect on thiocyanate ion (SCN^-) content in eggs. Although no significant difference was observed in the weight of eggs, addition of RSM increased egg production by 15%. After 4 weeks, the levels of SCN^- reached 1.6 mg/kg^{-1} in the experimental eggs and then remained almost constant. The control set had an average of 0.5 mg/kg^{-1} SCN^-. KAR

2617 MONSEY (JB) and JONES (JM). Limitations in the use of an enzymic test for monitoring the thermal pasteurization of dried chicken egg-white.
J. Food Technol. 16(4); 1981; 445-6
Enzymic test does not serve as an assessment technique for estimation of the thermal pasteurization of dried chicken egg-white. BSN

2618 HY-LINE TECHNICAL SERVICES. Nutritional management of egg size.
Poult. Guide. 18(10); 1981; 35-6

SEAFOODS

FISH

2619 DASARADHARAMI REDDY (B). Fishing industry in India.
East Econ. 77(14); 1981; 641-3

2620 GOSWAMI (UC) and BARUA (AB). Distribution of retinol and dehydroretinol in freshwater fish.
Indian J. Biochem. Biophys. 18(5); 1981; 383-5
In view of the extreme differences evident in the concentrations of retinol and dehydroretinol in freshwater and marine fishes, a quantitative analysis of these two compounds in the liver oils of fresh water fishes of North India was carried out. It was possible to separate out a specific taxonomic group as retinol-predominant or dehydroretinol predominant. The distribution of these two forms of vitamin A was found to be related to the habitat, morphological and anatomical characters, colour of the liver and the migratory habits of the fishes. MVG

2621 POZO LORA (R), POLO VILLAR (LM), HERRERA MARTEACHE (A), JODRAL VILLAREJO (M), JORDANO SALINAS (R) and ZURERA COSANO (G). Microbiological study of Spanish frozen fish.
An. Bromatol. 32(3); 1980; 271-80 (Spanish)
A microbiological examination of 141 samples of frozen Spanish fish was carried out. The sanitary quality was tested by determining total bacterial load viable at 35 C, coliform organisms, NMP of *E. coli* and enterococci, and the count of total enterobacteriaceae. Tests were also done to determine the presence of pathogenic organisms like Salmonellae, Shigellae, pathogenic *Staphylococci*, *Cl. perfringens*, and *V. parahaemolyticus*. The samples analyzed had to be regarded as deficient in microbiological quality, and "microbiological limits" have been proposed for this type of food. KMD

CARP

2622 MAI (J) and KINSELLA (JE). Changes in the lipid components of minced carp (*Cyprinus carpio*) following cooking.
J. Sci. Food Agric. 32(3); 1981; 293-9
The changes in weight, moisture, lipid content and composition, thiobarbituric acid (TBA) and carbonyl values were determined in minced carp following cooking by baking and deep-frying. Baked samples lost lipid via drip while the deep-fried samples absorbed oil. Free fatty acids decreased following cooking. Thiobarbituric acid (TBA) values increased following cooking by either method. Antioxidants (TBHQ and BHA) inhibited the production of TBA-reactive compounds though the production of carbonyls during deep-frying was enhanced. Tertiary butylhydroquinone (TBHQ) was slightly more effective than BHA in inhibiting the formation of TBA-reactive compounds. AA

MACKEREL

2623 VENUGOPAL (V). Quality of proteins in radurized Indian mackerel (*Rastrelliger Kanagurta*): Physico-chemical evaluation.
J. Food Biochem. 5(2); 1981; 145-54

The influence of gamma irradiation at a radurizing dose of 1.5 kGy on the proteins of Indian mackerel (*Rastrelliger kanagurta*) was examined. The fish proteins were comparatively stable towards changes by the treatment, as ascertained by several parameters. However, irradiation at 1.5 kGy resulted in enhancement in tryptic digestibility of sarcoplasmic proteins and ATPase activity of myosin. AA

KRILL

2624 SYNOWIECKI (J), SIKORSKI (ZE) and NACZK (M). Immobilization of invertase on krill chitin.
Biotechnol. Bioeng. 23(1); 1981; 231-3

PRAWN

2625 ANGEL (S), BASKER (D), KANNER (J) and JUVEN (BJ). Assessment of shelf life of fresh water prawns stored at o C.
J. Food Technol. 16(4); 1981;.357-66
Frozen (at 35 C) fresh water prawns were preferred by a sensory panel after 14 days storage as compared to those at O C. TBA values of O C stored prawn tails increased from 0.25 to 0.65 during the period, while TVBN values did so from 22 to 31 mg/100 g. This was accompanied by increase of about 2 logarithmic units of total aerobic psychrotrophic plate counts. BSN

PROTEIN FOODS

2626 COLLINS-THOMPSON (DL), WEISS (KF), RIEDEL (GW) and CHARBONNEAU (S). Microbial guidelines and sampling plans for dried infant cereals and powdered infant formula from a Canadian National Microbiological Survey.
J. Food Prot. 43(8); 1980; 613-6
Analysis of 130 lots of domestic and imported baby foods showed that the baby foods carried no health hazards. The results were used to develop a three-class acceptance plan for aerobic colony count (n=5, c=2, m=10^3/g, M=10^4/g); confirmed coliforms (n=5, c=1, m < 1.8/g, M=20/g); and *Salmonella* (n=20, c=0, m=0, M=0). Canadian-produced infant foods had an estimated lot rejection rate, based on the three-class acceptance plan, of 1.1 to 20.3%, based on cereal type and test organism. KMD

FRUIT JUICES AND BEVERAGES

FRUIT JUICE

2627 AMOS (G), BUTZ (M) and RENNSTICH (E). The situation of the utilization of direct-extraction.
Flussiges Obst. 47(4); 1980; 131-4 (German)
The prominent features of direct extraction are the continuous operation and the optimum juice yield. The polyphenol content in juices obtained by extraction was found to be higher than that of juices obtained by pressing. Two techniques have been mention-

ed to reduce the polyphenol content. These measures help to maintain the quality and the yield of juice. VR

2628 BINNIG (R). The influence of CO_2 during the pasteurization of fruit juices.
Flussiges Obst. 47(4); 1980; 134-9 (German)
The inhibiting effect of CO_2 on microorganisms in fruit juices has been described. Yeasts are inhibited only by higher CO_2 concentrations (Ca 15g/l). Lactic acid bacteria are not affected by CO_2 inhibition. The experiments with test spores showed that the temperature-time dependence of the heat killing is influenced by the CO_2 content of the substrate. The span (extent) of the influence is, however, smaller than the unknown effects, which are caused by the type and number of spores, condition of growth and composition of the substrate. Possibly this small effect is due to an increase in acidity by CO_2 dissolved in the substrate. The improvement of the pasteurizing effect by the CO_2 content found in these experiments is not much and hence it may not, in any case, lead to changes in pasteurization conditions. VR

2629 WUCHERPFENNIG (K) and WEBER (A). The new scheme of the quality examination of fruit juices, fruit nectars, juice-based beverages, fruit wines, and sparkling fruit wines by the DLG.
Flussiges Obst. 47(4); 1980; 160-62 (German)
The authors have described the new five point scheme introduced by the German Agricultural Society (DLG). This 5-point scale corresponds to the international development in the field of sensory quality examinations. The experiences with this new objective scheme show that it does not pose serious problems. VR

CITRUS JUICE

2630 ROBERTSON (GL). The determination of pectic substances in citrus juices and grapes by two spectrophotometric methods.
J. Food Biochem. 5(2); 1981; 139-43
The pectic substances in two samples of New Zealand grapefruit juice were determined by a spectrophotometric method after fractional extraction of the alcohol-insoluble solids. No significant difference in anhydrogalacturonic acid (AGA) content was found when the chromogen was formed using m-hydroxydiphenyl and carbazole. In the analysis of the pectic substances in red and white grape berries, chromogen formation with carbazole gave AGA contents of the water-soluble fraction of the alcohol-insoluble solids five to seven times greater than when the chromogen was formed using m-hydroxydiphenyl. It is suggested that phenolic material in the grape extracts reacted with the carbazole to give the higher apparent AGA contents. It is recommended that m-hydroxydiphenyl rather than carbazole be used when determining the pectic substances in fruits. AA

APPLE JUICE

2631 OSTERBERG (NO) and SMITH SORENSEN (T). Apple juice extraction in a counter-current diffuser.
J. Food Technol. 16(4); 1981; 379-402
Data obtained from concentration profiles of free apple juice in the apple slices measured at various temperatures and counter current flow rates in an industrial diffuser may be described by a theoretical model considering the time of plasmolysis as a

function of temperature. Diffuser yield gets lowered below and around 58 C when the concentration profiles break into two parts-before and after plasmolysis. When the water-to-apple volume ratio is well above unity, yield is not lowered. An overall recovery of soluble matter from apple stock to juice of above 90% is obtained. The axial dispersion coefficient of around 0.01 m^2/min. was observed at a mean speed of slices through the diffuser of about 0.06 m/min (holding time = 120 min). BSN

2632 WILSON (EL). High-pressure liquid chromatography of apple juice phenolic compounds.
J. Sci. Food Agric. 32(3); 1981; 257-64
Apple juice phenolic compounds: (+)-catechin, (-)-epicatechin, chlorogenic acid, phloridzin, phloretin xyloglucoside, and the polymeric procyanidins from the dimeric to the heptameric, were separated by high-pressure liquid chromatography on a CN column, run in the normal phase, using an acidified tetrahydrofuran-hexane solvent gradient. Individual procyanidin fractions, of different degrees of polymerisation, were collected from the CN column and the isomers from each fraction were then separated on a C18 column, using a methanol-aqueous KH_2PO_4 solvent gradient. AA

PHALSA FRUIT JUICE

2633 KHURDIA (DS) and ANAND (JC). Effect of extraction method, container and storage temperature on 'Phalsa' fruit juice (*Grewia subinaequairs* L.).
Indian Food Packer. 35(6); 1981; 68-72
Heating the crushed 'Phalsa' fruit to 50 C gave the highest recovery of the juice with an appropriate quantity of anthocyanins, acids, sugars, miners, etc. Colour in the juice was better retained during storage in glass than plastic containers. However, juice can be stored well at 3 C in plastic containers. Stability of colour in 'Phalsa' juice was the highest at 3 C followed by 20 C and room temperature (31-36 C). The shelf-life of the juice remained acceptable for a period of 100 days at 3 C, and 10 days at room temperature. AA

BEVERAGE

2634 STREIT (W). Rationalization of the transport of beverages.
Flussiges Obst. 47(4); 1980; 142-53 (German)

2635 WALTERS (CL) and SMITH (PLR). The effect of water-borne nitrate on salivary nitrite.
Food Cosmet. Toxicol. 19(3); 1981; 297-302
The increase in salivary nitrite concentration caused by drinking 0-50 mg nitrate was measured in eight volunteers (over the subsequent 4-6 hours). The magnitude of the increase was dependent on the amount of nitrate consumed and varied between individual volunteers. Significant increases were not usually obtained with nitrate intakes of less than 10 mg. Four of the volunteers had a low relatively constant resting salivary nitrite concentration whereas the remaining four subjects showed much greater variations in nitrite concentration before the nitrate drink. A correlation was obtained between the increase in salivary nitrite concentration after drinking 50 mg nitrate and the rate of fall

of the resting nitrite concentration during the period preceding consumption of the nitrate drink. AA

SOFT DRINK

2636 STURZER (K) and LIST (V). Dietetic juice based soft drinks in special consideration of the food processing regulations.
Flussiges Obst. 47(4); 1980; 156-60 (German)

2637 WALKLEY (VT). Microbiological testing of soft drinks.
Int. Bottler Packer. 55(4); 1981; 26

TEA

2638 SATTIGERI (VD), MANJUNATH (MN), NAGARAJA (KV), KRISHNAMURTHY(MN), SANDHU (JS) and KAPUR (OP). Comparison of methods for determination of iron filings in tea.
Indian Food Packer. 35(6); 1981; 37-41
The iron filings in tea may be determined by magnetic, colorimetric and gravimetric methods. Different values for iron filings content in tea have been obtained by following different methods. An attempt has been made to compare different methods such as (a) magnetic separation method, (b) carbon tetrachloride separation method, (c) colorimetric method, (d) carbon tetrachloride separation followed by colorimetric method and to standardise a simple, reliable and accurate method for the determination of iron filings. The results of such a study are reported in this paper. It has been found that magnetic separation method is simple and rapid giving reproducible results. The percentage recovery values of iron filings in different type of tea samples ranged from 93.3 to 97.3. AA

2639 COOPER (P). Dealing with theophylline.
Food Cosmet. Toxicol. 19(3); 1981; 389-90

COFFEE

2640 ANON. Third international caffeine workshop.
Nutr. Rev. 39(4); 1981; 183-91
Discusses the concerted international efforts made over the past years on obtaining information in the basic pharmocology, metabolism, pharmacokinetics, teratology and behavioural effects and toxicology of caffeine. BSN

BEER

2641 MEIXLSPERGER (R). Regeneration of kieselguhr from breweries and dry cleaning plant.
Chemie-Ingenieur-Technik. 52(4); 1980; 349 (German)

2642 MUTTER (PA). Indirect firing of malt kilns.
MBAA. Tech. Quart. 18(4); 1981; 180-84

2643 SMITH (CC) and MAUPOUX (MP). Experimental solar kilning of malt.
MBAA. Tech. Quart. 18(4); 1981; 205-13

2644 MOLL (M), FLAYEUX (R), LIPUS (G) and MARC (A). Biochemistry of mashing.
MBAA. Tech. Quart. 18(4); 1981; 166-73

2645 HANSEN (NL). Continuous countercurrent extraction of mash.
MBAA. Tech. Quart. 18(4); 1981; 196-200

2646 LEE (SY), MOORE (SE) and MABEE (MS). Selective-differential medium for isolation and differentiation of *Pectinatus* from other brewery microorganisms.
Appl. Environ. Microbiol. 41(2); 1981; 386-7

2647 YODA (Y), HIGASHI (T) and SASAHARA (T). Control of total nitrogen levels in brewery effluent by the activated sludge process.
MBAA. Tech. Quart. 18(4); 1981; 174-9

2648 KEITH (LW). Land application of brewery wastewater.
MBAA. Tech. Quart. 18(4); 1981; 201-4

2649 HAIKARA (A), PENTTILA (L), ENARI (TM) and LOUNATMAA (K). Microbiological, biochemical and electron microscopic characterization of a *Pectinatus* strain.
Appl. Environ. Microbiol. 41(2); 1981; 511-7

COCOA

2650 ANON. New infrared machine for cocoa processing.
Confect. Prod. 47(6); 1981; 308-9

WINE

2651 CASANOVA (A), COSSON (H) and SAUGNAC (A-M). Musts and wines. Corrected specific gravity.
Ann. Technol. Agric. 29(1); 1980; 1-12 (French)
Correction tables allow us to give specific gravity $d\frac{20}{20}$ for musts and wines. A double interpolation is necessary to interpret this data. AA

2652 FLANZY (C), ANDRE (P), BENARD (P) and CHAMBROY (Y). Wine making by carbonic maceration. VIII. Preheating of grapes.
Ann. Technol. Agric. 29(1); 1980; 13-25 (French)
A high temperature (30-35 C) during the first stage of fermentation by carbonic maceration is necessary to obtain harmonious wines. It is difficult to get these temperatures when the grapes are cold, at grape ratting. We have studied a warming design for no crushed grape by long contact with hot exogenous must. After the carbonic maceration of those grapes, the analytical wine characteristics are slightly different from those coming from strict carbonic maceration. From organoleptic view point, the quality of the first type wines are comparable to the control. Complementary studies are necessary to definite the temperature value that must be obtained by heating. AA

ARRACK

2653 SAMARAJEEWA (U), ADAMS (MR) and ROBINSON (JM). Major volatiles in Sri Lankan arrack, a palm wine distillate.
J. Food Technol. 16(4); 1981; 437-44

Major volatiles of several commercial samples of arrack of Sri Lanka were found to be similar to those present in other potable spirits, although, their proportions showed divergence. Between brands, the variations may be due to differences in quality of fermented toddy used. Ethyl lactate is present in all the samples and the production of the ester appears to be a characteristic feature of mixed lactic-alcoholic fermentations. BSN

OILS AND FATS

2654 LAWRENCE (BM). Progress in essential oils.
Perfum. Flavor. 6(5); 1981; 27-34
Discusses: ammoniac gum; eucalyptus, globulus oil; eugenol containing oils; marjoram oil; sandal wood oil; and wild thyme oil. BSN

2655 LAWRENCE (BM). Progress in essential oils.
Perfum. Flavor. 6(3); 1981; 46-9
Discusses: angelica root oil; artemisia afra oil; corn mint oil; fennel oil; nutmeg oil; sage oil and others. BSN

2656 GEHRING (H). Steam jet vacuum pumps in the edible oil industry. Lay out characteristics and operational behaviour.
Fette Seifen Anstrichm. 82(8); 1980; 307-11 (German)

2657 YUEN (WK) and KELLY (PC). Determination of phosphorus in oils using oxygen bomb ashing.
J. Am. Oil Chem. Soc. 57(10); 1980; 359-61
A fast method for phosphorus determination in an oil matrix is described. The principle of the method is similar to that of the AOCS method, but the ashing of the oil is accelerated using an oxygen bomb. In addition, a rapid molybdovanadate reagent is used for colorimetry rather than the molybdenum blue reagents specified in the AOCS method. Agreement with the air ashing procedure averages less than 5% difference above 10 µg/g. The detection limit is in the order of 1-2 µg/g. AA

2658 BADAMI (RC), PATIL (KB), SUBBA RAO (YV), SASTRI (GSR) and VISHVA NATH RAO (GK). Cyclopropenoid fatty acids of sterculia oils by gas liquid chromatography.
Fette Seifen Anstrichm. 82(8); 1980; 317-8
Silver nitrate treated methyl esters of the seed oils of *Sterculia alata*, *Sterculia foetida*, *Sterculia guttata* and *Sterculia villosa* were subjected to gas liquid chromatography and were found to contain sterculic and malvalic acids (4.0, 17.6; 55.7, 11.4; 5.8, 2.1 and 3.2, 2.5% respectively), besides the conventional fatty acids. IR and NMR of the oils confirmed the cyclopropenoid moiety in these oils. Seed oil of *Sterculia foetida* was used as a standard reference. AA

2659 PLACHENKA (J) and JEROMIN (L). Application of computer programs on the simulation and optimization of rectification plants in fatty chemicals industry.
Fette Seifen Anstrichm. 82(8); 1980; 300-307 (German)

2660 PATZELT-WENCZLER (R). Effect of vitamin E on the synthesis of polyunsaturated fatty acids.
Int. J. Vitamin Nutr. Res. 51(1); 1981; 26-33 (German)

2661 JOHANNISBAUER (W) and MARZENKE (J). Column elements for vacuum rectification columns with special consideration of fatty acid fractionation.
Fette Seifen Anstrichm. 82(8); 1980; 297-300 (German)

SPICES AND CONDIMENTS

PEPPER

2662 IQBAL (BA). Pepper outlook not promising.
East. Econ. 77(17); 1981; 773-5

CORIANDER

2663 VASUNDHARA (TS) and PARIHAR (DB). Studies in pyrazines formed in roasted spices: *Coriandrum sativum*, *Cuminum cyminum* and *Trigonella foenum-graecum*.
Nahrung. 24(7); 1980; 645-51
Roasted spices are extensively used as flavour enhancers in various curries, sausages, and soups. Pyrazines, which are potential flavour enhancers make a substantial contribution. Various pyrazines have been detected in roasted spices viz coriander, cumin and fenugreek seeds. By employing TLC and Dragendorff's reagent pyrazines could be detected and estimated down to 2.5 and 5 µg respectively. They can be conveniently characterized by their distinct UV and IR spectra. AA

SENSORY EVALUATION

Nil

FOOD STORAGE

2664 ANON. Silo handling of sticky flour derivatives.
Milling Feed Fert. 164(4); 1981; 16-9

2665 PADIVAL (RA), RANGANNA (S) and MANJREKAR (SP). Stability of pectins during storage.
J. Food Technol. 16(4); 1981; 367-78
Low methoxyl pectins (LMP) prepared by HCl, NaOH and NH_3 deesterification procedures were stored with or without adding Na_2CO_3 as buffer at room temperature (25-30 C) or exposed to different relative humidities (r.h.) at 37 C. Losses of methoxyl, molecular weight and gelling power were observed in all the pectin samples. During storage, NaOH and NH_3 deesterified LMP were more stable than HCl deesterified LMP with respect to gelling power. The monolayer values (V_m) of 0.5 to 0.7 g per 100 g of LMP showed that even when stored at 11% r.h., the moisture in LMP was present in the multilayer region which was conducive to methoxyl loss. NH_3 deesterified LMP precipitated at pH 0.5 and 1.5 after saponification, formed good gels similar to the LMP precipitated at pH 0.5, dried and mixed with buffer NH_3 deesterified LMP precipitated at pH 3.0 and 4.5, on the contrary, formed only coagulated

gels. The loss of gelling power of LMP during storage was due to deploymerization besides gradual transformation of increasing por tions of pectinic acid molecules into pectic acid molecules. High methoxyl pectins with or without added sodium carbonate or citrate as buffer stored at 62 and 75% r.h. showed methoxyl loss. Between r.h of <0.1 and 49%, methoxyl loss was more in the buffered samples than in the control. AA

INFESTATION CONTROL AND PESTICIDES

2666 DEB (OC) and CHAKRAVORTY (S). Juvenoid-induced effects on the growth and differentiation of testis in the rice moth, *Corcyra cephalonica*.
J. Insect Physiol. 27(6); 1981; 397-402

2667 SINGH (SA). Pesticide pollution: An analysis of the problem.
Pesticides. 15(6); 1981; 3-12

2668 MURAI (T). Photochemical decomposition of pesticides in the environment.
Jpn. Pestic. Inf. 38; 1981; 13-6

2669 ANON. Determination of residues of dithiocarbamate pesticides in foodstuffs by a headspace method.
Analyst. 106(1264); 1981; 782-7
The report presented by the Committee for Analytical Methods for Residues of Pesticides and of Veterinary products in Foodstuffs, Ministry of Agriculture, Fisheries and Food, U.K., discusses the following aspects; comparison of methods; solvent layer procedure; collaborative studies on the solvent-layer and headspace methods; collaborative studies of the headspace method for several dithiocarbamates; use of headspace method on other foodstuffs; sampling; recommended method for determination of dithiocarbamate residues in lettuces using a headspace procedure. BSN

2670 SINGH (K) and SINGH (J). Effect of temperature and concentration on the suspensibility of some water dispersible powders.
Pesticides. 15(6); 1981; 13-7

2671 BELISLE (J). Organic fluorine in human serum. Natural versus industrial sources.
Science. 212(4502); 1981; 1509-10

2672 KASHIMOTO (T), MIYATA (H) and KUNITA (N). The presence of polychlorinated quaterphenyls in the tissues of Yusho victims.
Food Cosmet. Toxicol. 19(3); 1981; 335-40
In 1968, over 1300 Japanese were affected by the "Yusho" disease which is characterized by acne, pigmentation of the skin, and nervous and gastro-intestinal disorders. It was caused by contamination of rice oil (used for cooking) with Kanechlor-400 (KC-400) a Japanese PCB preparation. The PCB level in the oil was estimated to be 2000-3000 ppm. The authors, however, found that the oil manufactured on 5 February 1968 contained only 968 ppm of PCB and 7.8 ppm of polychlorodibenzofuran. Further analysis of the oil showed that polychlorinated quaterphenyl (PCQ), amounting to 0.95 - 3.5 times the quantity of PCB, was present in the oil. Even 12 years after the first outbreak of Yusho, PCQs can be detected in as little as 10 ml of the Yusho patients blood. KMD

2673 SEN (AK), SARKAR (KK), MAJUMDER (PC) and BANERJI (N). Minor xanthenes of *Garcinia mangostana*.
Phytochemistry. 20(1); 1981; 183-5

2674 WESTPHAL (D), LUCAS (K) and HILBIG (V). Studies of the arylhydroxylation of monochlorophenylureas in the isolated perfused rat liver.
Food Cosmet. Toxicol. 19(3); 1981; 341-5
The authors have tried to clear up the prevailing confusion arising from the divergent results obtained in metabolic studies on the herbicide monolinuron, i.e. (3-(4-chlorophenyl)-1-methoxy-1-methylurea), conducted on perfused rat and hen livers and those on rats, pigs, and hens, *in vivo*. They conclude that perfused rat liver is only of limited suitability for studies of the biotransformation of foreign materials, at least with respect to arylhydroxylation when halogen substituents are involved. KMD

2675 PELISSIER (MA), FAUDEMAY (F), DOOH-PRISO (E), ATTEBA (S) and ALBRECHT (R). Reduction of the activity of microsomal oxygenases by a dithiocarbamate fungicide, namely zineb: effects of a diet containing 9% casein.
Food Cosmet. Toxicol. 19(3); 1981; 357-60
Ingestion of zineb (zinc 1,2-ethylene bis(dithiocarbamate) lowered the activities of aminopyrine N-demethylase (ADPM) and aniline hydroxylase (AH) calculated on the basis of protein, but had no effect on their activities expressed in terms of P-450 units. The treatment did not modify the cytochrome P-450 and b_5 levels significantly, nor the activity of the NADPH-cytochrome C reductase. The fungicide augmented the hexobarbital-induced sleeping time. The low-protein diet (i.e. 9% casein diet) did not modify the effects of zineb on the microsomal oxygenases or vice versa, so the zineb-treated rat fed on a deficient diet metabolizes xenobiotics very slowly. KMD

2676 HIRAGA (K) and FUJII (T). Induction of tumours of the urinary system in F344 rats by dietary administration of sodium o-phenylphenate.
Food Cosmet. Toxicol. 19(3); 1981; 303-10
Sodium orthophenylphenate (OPP-Na), which is a fungicide approved as a food additive in Japan, has been found to produce tumours in the urinary bladder, renal pelvis, and renal papilla. The incidence of neo-plastic lesions of the kidney increased with the dose. Administration of OPP-Na produced slight to moderate pyelonephritis after 13 weeks, and severe pyelonephritis after 91 weeks. KMD

2677 LUND (M). Comparative effect of the three rodenticides warfarin, difenacoum and brodifacoum on eight rodent species in short feeding periods.
J. Hyg. 87(1); 1981; 101-7
Short laboratory feeding tests were carried out with the anticoagulants warfarin, difenacoum, and brodifacoum on a number of European rodent species: *Clethrionomys glareolus*, *Microtus agrestis*, *M. arvalis*, *Apodemus flavicollis*, *A. sylvaticus*, *Mus musculus*, *Rattus rattus* and *R. norvegicus*. It was found that the toxicity to all species was highest with brodifacoum and lowest with warfarin, and that only 0.005% brodifacoum would give a complete mortality in most species after one day's feeding. The potential of this compound for the control of microtine field rodents is suggested. AA

BIOCHEMISTRY AND NUTRITION

2678 ACTON (JC), HANNA (MA) and SATTERLEE (LD). Heat-induced gelation and protein-protein interaction of actomyosin.
J. Food Biochem. 5(2); 1981; 101-13
Natural actomyosin (NAM) and "crude" actomyosin formed gels yielding maximum strengths (from back extrusion force) at pH 5.0 and 5.5, respectively. At pH 6.0, NAM gels had a least protein concentration endpoint (LCE) value of 6 mg/ml; Gel strength increased exponentially with an increase of NAM concentration from 3.75-10 mg/ml. With constant time (30 minutes)-temperature heating, NAM gel forces increased by 20.5% (NS, $P > 0.05$) in the 30-80 C range. Arrhenius plots of NAM interaction in solution and in gelation at pH 6.0 indicated two different reaction mechanisms within the temperature zones above and below approximately 35 C for solutions and 40 C for gels. Similarity of interaction slopes above the 35-40 C region suggested one reaction mechanism for NAM molecular aggregation in solution and gelation. AA

2679 FREIMUTH (U) and NOTZOLD (H). On the alkali treatment of proteins. Part IV. The detection of lysinoalanine in proteic substances.
Nahrung. 24(7); 1980; 627-32 (German)
The authors developed a thin-layer chromatographic method for detecting lysinoalanine (LAL) in protein hydrolysates. High voltage electrophoresis suitable for the preparative isolation of LAL, was not found appropriate for analytical work, because of the presence of background colour. AA

2680 AUST (L), POLEDNE (R), ELHABET (A) and NOACK (R). The hypolipaemic action of a glycine rich diet in rats.
Nahrung. 24(7); 1980; 663-71
Feeding of a glycine rich diet with sufficient supply of essential amino acids (mixture of casein and gelatin) causes a significant reduction of the serum triglyceride level in rats. The decreased serum triglyceride level of the serum corresponded to a decreased lipoprotein lipase activity in the epididymal adipose tissue, whereas the basal and norepinephrine stimulated lipolysis of this tissue was not affected. From these results, it is concluded that due to the feeding of a glycine rich diet, the triglyceride secretion of the liver decreases leading to a lower serum triglyceride level. AA

2681 VARO (P) and KOIVISTOINEN (P). Annual variations in the average selenium intake in Finland: Cereal products and milk as sources of selenium in 1979/80.
Int. J. Vitamin.Nutr. Res. 51(1); 1981; 79-84

2682 CAMPBELL (TC), ALLISON (RG) and FISHER (KD). Nutrient toxicity.
Nutr. Rev. 39(6); 1981; 249-56

2683 ELNAGGAR (B), GAAFAR (S), ALLAM (H), OSMAN (N) and HUSSEIN (L). Study of the absorption of vitamin A oily preparation among school pupils from the rural.
Int. J. Vitamin. Nutr. Res. 51(1); 1981; 3-8

2684 FERRANDO (R), PALISSE (M), JACQUOT (L) and FOURLON (C). Transfer of vitamin A to the egg influenced by bacitracin or flavomycin.
Int. J. Vitamin Nutr. Res. 51(1); 1981; 9-15 (French)

2685 GARCIA OLMEDO (R), CARBALLIDO (A) and SILVELA (S). Vitamins B_1, B_2 and B_6 in precooked foods.
An. Bromatol. 32(3); 1980; 223-48
Thirty samples of precooked foods were analyzed for their content of vitamins B_1, B_2 and B_6; 15 samples were based on vegetables, 5 on pot herbs, 4 on food pastes, and 6 on meat. All the samples contained these three vitamins to a greater or lesser extent. The highest thiamine content (170 µg/portion of 210 g) was found in "La Mancha soup", the highest riboflavin content (173.03 µg/portion of 225 g) in "lentils with pork sausage, and the highest pyridoxine content (825.14 µg/portion of 225g) in "Asturian faba beans". In general, most of the cooked dishes have low contents of vitamins B_1 and B_2 because, the raw materials used in them are known not to be good sources of these vitamins. The supply of vitamin B_6 is more variable, as most of the samples supply only 7-10% of the daily requirement, and only one supplied as much as 14%. KMD

2686 MARTINEZ PARA (MC) and TORIJA ISASA (ME). The nettle as a food. III. Ascorbic acid.
An. Bromatol. 32(3); 1980; 295-8 (Spanish)
Ascorbic acid content in 20 samples of nettles was found to range between 64 and 216 mg/100 g edible material, the average value being 106.66 mg%. KMD

2687 MARTIN (P), SUAREZ (A), POLO (C), CABEZUDO (D) and DABRIO (MV). Analysis of 19 aminoacids by HPLC.
An. Bromatol. 32(3); 1980; 289-94 (Spanish)
Reversed phase, high-performance, liquid chromatography was applied in order to separate 19 dansyl-aminoacids by means of solvent polarity gradient (methanol-phosphate buffer) and a fluorescence detector. The whole analysis takes just 45 minutes. This investigation was done on musts and wines, and, hence, conditions for their dansylation have also been standardised. KMD

2688 ANTENER (I), TONNEY (G), VERWILGHEN (AM) and MAURON (J). Biochemical study of malnutrition. Part IV. Determination of amino acids in the serum, erythrocytes, urine and stool ultrafiltrates.
Int. J. Vitamin. Nutr. Res. 51(1); 1981; 64-78

2689 WINICK (M). Malnutrition and a young child's mind.
Cajanus. 14(2); 1981; 79-83

2690 POLLITT (E) and LEWIS (N). Nutrition and educational achievements: Part 1. Malnutrition and behavioural test indicators.
Food Nutr. Bull. 2(3); 1980; 32-5

TOXICOLOGY AND HYGIENE

2691 GLAUERT (HP), BENNINK (MR) and SANDER (CH). Enhancement of 1,2-dimethylhydrazine-induced colon carcinogenesis in mice by dietary agar.
Food Cosmet. Toxicol. 19(3); 1981; 281-6
It has been shown that the ingestion of agar can cause adverse effects in the rat colon. Therefore, the consumption of agar by humans may be deleterious, and the biological effects of agar should be examined further. The study also points out the heterogeneity of dietary fibres. They should not be treated as a homo-

geneous group, particularly as components and substituents of a fibre determine its properties. KMD

2692 JAMES (RW), HEYWOOD (R) and CROOK (D). Testicular responses of rats and dogs to cyclohexylamine over dosage.
Food Cosmet. Toxicol. 19(2); 1981; 291-6

Cyclohexylamine (CHA), the principle metabolite of cyclamate, was given by oral route to male rats (200 mg/kg/day) and male Beagles (250 mg/kg/day) for 9 weeks. Subsequently, some of these animals were maintained undosed for 13 weeks to assess recovery. CHA adversely affected body weight gain and food consumption in both species. The only lesion detectable by conventional histological examination was fecal atrophy of seminiferous tubules in one rat examined 13 weeks after cessation of CHA treatment. Quantitative assessment of testicular spermatogenesis showed that CHA administration reduced the counts of pachytene spermatocytes, and of early and late spermatids, in both species. These effects were apparently reversible in dogs but not in rats. AA

2693 BROWN (GG), PREISMAN (RC), ANDERSON (MD), NIXON (RK), ISBISTER (JL) and PRICE (HA). Memory performance of chemical workers exposed to polybrominated biphenyls.
Science 212(4501); 1981; 1413-5

2694 FERON (VJ), HENDRIKSEN (CFM), SPEEK (AJ), TIL (HP) and SPIT (BJ). Lifespan oral toxicity study of vinyl chloride in rats.
Food Cosmet. Toxicol. 19(3); 1981; 317-33

A lifespan oral toxicity study of vinyl chloride monomer (VCM) was carried out in five groups of Wistar rats each consisting of 60-80 males and 60-80 females. The present study showed that orally administered VCM is a carcinogen in rats, and that the "no-observed-adverse-effect level" in rats was lower than 1.7 mg/kg body weight/day under the rigorous conditions of continuous oral VCM exposure resulting from the release of VCM from PVC powder present in the gastro-intestinal tract. AA

2695 THOMPSON (ED) and HILES (RA). A method for determining the maximum tolerated dose for *in vivo* cytogenetic analysis.
Food Cosmet. Toxicol. 19(3); 1981; 347-51

Data from acute studies of methyl methanesulphonate, glycidol and dimethylsulphoxide were used to determine maximum tolerated doses (MTD) for subchronic studies. The acute LD_{50} values were determined for each compound, and the LD_{10} and LD_1 values were calculated by probit analysis. The amounts represented by these values, along with those equivalent to the 0.5 LD_1 and 0.1 LD_1 values were dosed daily for 5 days to rats. The groups dosed with the 0.5 LD_1 level generally had few deaths and the body weights were within 80% of the solvent-control group. Moreover, bone-marrow cells from these animals produced acceptable mitotic figures. Thus, the 0.5 LD_1 value derived from acute studies was determined to be a generally acceptable MTD for subchronic cytogenetic studies. AA

2696 CARLBORG (FW). Multi-stage dose-response models in carcinogenesis.
Food Cosmet. Toxicol. 19(3); 1981; 361-5

A frequently proposed multi-stage doseresponse model for carcinogenesis is evaluated theoretically and on the basis of existing experimental results. Several defects in this model are revealed. A modified form of the Weibull model, without these defects, is proposed as an alternative. AA

2697 CARLBORG (FW). 2-acetylaminofluorene and the Weibull model.
Food Cosmet. Toxicol. 19(3); 1981; 367-71
The Weibull model for dose-response functions in carcinogenesis is explored with respect to the results from the large experiment with 2-acetylamino-fluorene (2-AAF). Several generalized forms of the Weibull model are presented. Also, the hypothesis of 'low-dose linearity' is tested with the data for 2-AAF. AA

2698 GRICE (HC), MUNRO (IC), KREWSKI (DR) and BLUMENTHAL (H). *In Utero* exposure in chronic toxicity/carcinogenicity studies.
Food Cosmet. Toxicol. 19(3); 1981; 373-9
The need for *in utero* exposure in chronic toxicity/carcinogenicity is reviewed but more comparative data are required to evaluate fully the need for such protocols in safety evaluation programmes. Practical considerations including cost, selection of the second generation animals and dose levels to be used are discussed. In evaluating the results of studies involving perinatal exposure it is also necessary to consider such factors as the additional tissues through which the test chemical passes and differences in susceptibility between developing and mature tissues. AA

2699 FENICAL (W), OKUDA (RK), BANDURRAGA (MM), CULVER (P) and JACOBS (RS). Lophotoxin. A novel neuromuscular toxin from pacific sea whips of the genus *Lophogorgia*.
Science. 212(4502); 1981; 1512-14

2700 BRYAN (FL), SMITH (JD) and McKINLEY (TW). Hazard analysis of frozen dinners prepared at a catering establishment.
J. Food Prot. 43(8); 1980; 608-12

2701 LAMPERT (JP). Biological hazards of microwave radiation.
J. Food Prot. 43(8); 1980; 625-8

2702 CUNNINGHAM (FE). Influence of microwave radiation of psychrotrophic bacteria.
J. Food Prot. 43(8); 1980; 651-5

2703 BUCKER (ER) and MARTIN (SE). Superoxide dismutase activity in thermally stressed *Staphylococcus aureus*.
Appl. Environ. Microbiol. 41(2); 1981; 449-54

2704 KRIEK (NPJ) and WEHNER (FC). Toxicity of *Penicillium italicum* to laboratory animals.
Food Cosmet. Toxicol. 19(3); 1981; 311-5
The toxicity to ducklings and rats of a strain of *Penicillium italicum* isolated from an orange is described. Apart from a reduction in live-weight gain, feeding *P. italicum* culture material to ducklings at a dietary level of 50% (w/w) had no apparent detrimental effect over a period of 14 days. When the culture material was fed to rats at a dietary level of 8 or 32% (w/w) five out of six rats given the higher dose level died. The mean time to death was 78 days. A prominent cirrhosis of the liver was the predominant pathological change. This cirrhosis was characterized histologically by pseudolobulation, nodular hyperplasia, scant bile-duct proliferation and the presence of various numbers of anaplastic cells. AA

2705 BENNETT (JW), DUNN (JJ) and GOLDSMAN (CL). Influence of white light on production of aflatoxins and anthraquinones in *Aspergillus parasiticus*.
Appl. Environ. Microbiol. 41(2); 1981; 488-91

The effects of continuous light and continuous darkness on the growth of *Aspergillus parasiticus* and on the production of aflatoxin, averufin, versicolorin A, and versicolorin C by *Aspergillus parasiticus* were determined at six different temperatures with six replicates for each experiment. No growth was observed at 15 C in the light, although slight growth was observed at this temperature in the dark. No aflatoxins or anthraquinones were produced in the light or dark at 35 and 40 C, although growth was good at these temperatures. Differences in aflatoxins and anthraquinones for cultures grown in light and in dark were consistent at each temperature. Higher mean quantities of these secondary metabolities were produced in the light at 20 and 25 C; lower mean quantities were produced in the light at 30 C. The ranges of values overlapped considerably, but in all cases the differences between temperatures were significant. AA

2706 WEI (C-I), MACY (JM) and HSIEH (DPH). Biotransformation of aflatoxin B_1 and its conjugated metabolites by rat gastrointestinal microfloras.
Appl. Environ. Microbiol. 41(2); 1981; 549-51

Rat cecal microflora from high- and low-fiber-fed animals hydrolyzed aflatoxin conjugates to metabolites indistinguishable from aflatoxin B_1 and aflatoxin P_1, but aflatoxicol was not a transformation product. AA

2707 GAUR (PK), LAU (HP), PESTKA (JJ) and CHU (FS). Production and characterization of aflatoxin B_{2a} antiserum.
Appl. Environ. Microbiol. 41(2); 1981; 478-82

GENERAL

2708 ANON. Biological technologies for tomorrow society.
Ind. Aliment. 19(177); 1980; 841-4 (Italian)

2709 FARRER (KTH). Food odyssey-2001. Food science and technology.
Food Technol. Aust. 33(7); 1981; 342-6

2710 URQUHART (JR). Food odyssey-2001. Food manufacturing.
Food Technol. Aust. 33(7); 1981; 316-20
The discussion is mainly with reference to Australia. KAR

2711 TAGLE (MA). Operational conflicts of food aid at the recipient level.
Food Technol. Aust. 33(8); 1981; 368, 370-71
For several years, the author worked as team leader of a project whose purpose was to study the acceptability of a non-traditional food, experimentally added to the food basket in selected food-aid projects in Africa (Egypt, Liberia, Mali, Niger and Senegal) and Asia (Indonesia, Pakistan, Sri Lanka and the Philippines). This provided the unique opportunity to observe the problem of food aid at the micro-level in nine countries: in four it dealt with institutional feeding; in four others with the delivery of dry foods, and in one with both institutional feeding and delivery of dry foods. It has allowed the author to describe, analyse, comment on, and discuss the validity of this type of intervention. AA

2712 BIJLANI (RL). New foods for old thoughts.
Indian J. Nutr. Dietet. 18(1); 1981; 24-33
Aspects discussed include, supply-demand discrepancy, poverty, oilseeds, grain protein concentrates, leaf as food, fish protein concentrates, single cell protein, whey synthetic nutrients, metamorphosed foods, barriers to new foods; economic factors, social factors, political factors and how to launch a new food. BSN

2713 BAILEY (J). What the lab can do?
Food Manuf. 56(6); 1981; 23

2714 ANON. The laboratories at leatherhead.
Food Manuf. 56(6); 1981; 29,31,41,43

2715 LABUZA (TP). Food laws and regulation: The impact on food research.
Food Drug Cosmet. Law J. 36(6); 1981; 293-302

2716 ORLANS (MH). Phase I of the FTC's food advertising rule: Its scope and impact.
Food Drug Cosmet. Law J. 36(5); 1981; 220-28

2717 WARD (JW). Compliance with the new food and drug administration regulations: An approach by industry.
J. Dairy Sci. 64(9); 1981; 1874-81

2718 WILLETT (LB). Impact of new food and drug administration regulations on college, university and experiment station researchers.
J. Dairy Sci. 64(9); 1981; 1882-5

2719 DAVIDS (JA). FDA administrative inspections: Authority and practical applications.
Food Drug Cosmet. Law J. 36(5); 1981; 229-44

2720 McNAMARA (SH). The FDA inspection: What you need to know to protect your company?
Food Drug Cosmet. Law J. 36(5); 1981; 245-57

2721 CROWN (MF). Improving the labelling process.
Food Drug Cosmet. Law J. 36(5); 1981; 258-69

2722 SCHINDLER (JR). A common sense appraoch to common or usual names, if any there be.
Food Drug Cosmet. Law J. 36(6); 1981; 284-92

2723 ALLERA (EJ). FDA's use of guidelines, notices of proposed rulemaking, and compliance policies as De Facto Rules: An abuse of discretion.
Food Drug Cosmet. Law J. 36(5); 1981; 270-80

2724 KAHAN (JS). Criminal liability under the Federal Food, Drug, and Cosmetic act. The large corporation perspective.
Food Drug Cosmet. Law J. 36(6); 1981; 314-31

2725 DECKERT (J). Tasks of quality assurance and standardization in the food industry.
Lebensmittel-industrie. 27(9); 1980; 385-90 (German)

2726 KAGELMANN (G). Experience in application of control programmes of the internal quality assurance.
Lebensmittel-industrie. 27(9); 1980; 390-92 (German)

2727 DANEK (J). Assurance of the quality of the products of the Food industry in Czechoslovakia.
Lebensmittel-industrie. 27(9); 1980; 395-6 (German)

2728 SIEBERT (G). New standards for ready to cook products. Revised.
Lebensmittel-industrie. 27(9); 1980; 404-8 (German)
The article gives a survey of the revised versions of the standards for ready-to-cook soups, meals, low sodium dietary soups, soups for large scale kitchens, and sauces, ready-to-serve soups and liquid sauces, which are obligatory since September 1, 1980. AA

2729 JENKINS (DM). Gasohol: Outlook for production.
Cereal Food World. 26(11); 1981; 612-15
Describes the sources for ethanol production, process options, economics, incentives, market acceptance and outlook for alcohol fuels. KAR

FOOD PROCESSING AND PACKAGING

2730 HOLMES (ZA) and WOODBURN (M). Heat transfer and temperature of foods during preparation.
CRC Crit. Rev. Food Sci. Nutr. 14(3); 1981; 231-94
Discusses the methods of evaluating thermal stress as applied to commodities and the associated problems. BSN

2731 GUTIGER (W). Convective drying in a circulating ball packing.
Chemie-Ingenieur-Technik. 52(6); 1980; 518-20 (German)

2732 WATSON (B). Packaging in a flash?
Food Flavour. Ingred. Packag. Process. 3(10); 1981; 37

2733 FISHER (DP). Development of aseptic packaging.
Food Manuf. 56(8); 1981; 25,27

2734 RIZVI (SSH). Requirements for foods packaged in polymeric films.
CRC Crit. Food Sci. Nutr. 14(2); 1981; 111-34
Discusses : perishable foods; frozen foods and dehydrated foods; and problems associated with them when packaged in polymeric films. BSN

2735 SCHMIDT (H-U). On packaging materials and packages as protection against stored-product insects.
Getriede-Mehl Brot. 34(8); 1980; 215-7 (German)
Packed foodstuffs and condiments are attacked by stored-product insects. Only glass bottles or cans give absolute protection. Six typical insects, dry fruit moth, corn beetles, bread beetles, grain capuchins, red-brown and american rice flour beetles infest them. An interesting method for examining packaging foils with regard to the mechanical power of resistance to these insects has been described in detail. KMD

FOOD ENGINEERING AND EQUIPMENT

2736 KARMAS (E). Measurement of moisture content.
Cereal Food World. 26(7); 1981; 332-4
Describes the sampling procedure and measuring methods for water content in foods. KAR

2737 LABUZA (TP) and CONTRERAS-MEDELLIN (R). Prediction of moisture protection requirements for foods.
Cereal Food. World. 26(7); 1981; 335-43
Prediction of moisture gain or loss using engineering solutions; moisture content and food stability, measurement of water vapour transmission rates, effect of pinholes on film permeability, and prediction of moisture transfer from packaged food are some of the aspects covered. KAR

2738 CLELAND (AC), EARLE (MD) and BOAG (IF). Application of multiple linear regression to analysis of data from factory energy surveys.
J. Food Technol. 16(5); 1981; 481-92

2739 REINHARDT (H) and LOFFLER (F). Costs of dust removal.
Chemie-Ingenieur-Technik. 52(5); 1980; 369-74 (German)

2740 MAYER-SCHWINNING (G) and RENNHACK (R). New insights and applications in the electrostatic precipitation of dusts and mists.
Chemie-Ingenieur-Technik. 52(5); 1980; 375-83 (German)

2741 FISCHER (P), HEITBAUM (J) and VIELSTICH (W). Mechanism of oxygen reduction.
Chemie-Ingenieur-Technik. 52(5); 1980; 423-5 (German)

2742 STEIFF (A), POGGEMANN (R) and WEINSPACH (P-M). Heat transfer in agitated vessels with multiphase systems.
Chemie-Ingenieur-Technik. 52(6); 1980; 492-503 (German)

2743 KALKERT (N) and SCHECKER (H-G). Influence of particle size distribution on the minimum ignition energy of explosive dusts.
Chemie-Ingenieur-Technik. 52(6); 1980; 515-7 (German)

2744 STREIFF (F). Highly adaptable static mixers.
Chemie-Ingenieur-Technik. 52(6); 1980; 520-2 (German)

2745 DAVIS (N). Finer filtration.
Process Eng. 62(9); 1981; 81-2

2746 ANON. Rotary cooker system reduces energy costs - increases output.
Food Prod. Manag. 103(11); 1981; 16

2747 MYLES (Z). Experiments in cooking with solar energy.
Invent. Intell. 16(12); 1981; 538-41

FOOD CHEMISTRY AND ANALYSIS

2748 MAGA (JA). The chemistry of oxazoles and oxazolines in foods.
CRC Crit. Rev. Food Sci. Nutr. 14(3); 1981; 295-307
Discusses : occurence in food; sensory properties; and synthesis. BSN

2749 LEUNG (HK). Structure and properties of water.
Cereal Food. World. 26(7); 1981; 350-54
After describing the water molecule, the author deals with the structural models of water, structure of water near a solid interface, what is bound water and the nature of water binding in doughs and bread. KAR

2750 FERRO FONTAN (C), CHIRIFE (F) and BOQUET (R). Water activity in multicomponent non-electrolyte solutions.
J. Food Technol. 16(5); 1981; 553-9
The model equation developed for calculating water activity (a_w) in multicomponent non-electrolyte solutions has been used for predicting a_w of fruit juice concentrates on the strength of their sugar components. BSN

2751 FUKUDA (M) and YAMAGUCHI (T). Hydroxyproline content in several foods.
J. Jpn. Soc. Food Sci. Technol. 27(11); 1980; 576-8 (Japanese)
A simple colorimetric method was used to determine hydroxyproline in food. Dried foods were hydrolyzed in 6N HCl at 110 C for 18 hours, and then hydroxyproline in the hydrolyzate was determined after neutralization. Hydroxyproline content in many kinds of foods was determined. In general, animal tissues contained more hydroxyproline than vegetable tissues. Moreover, animal tissues showed higher value of hydroxyproline per protein than vegetable tissues. Significant quantities of hydroxyproline-containing proteins were extracted from animal tissues with 0.6N HCl, but those of vegetable tissues were small amounts. AA

2752 DEOSTHALE (YG). Molybdenum content of some common Indian foods.
Indian J. Nutr. Dietet. 18(1); 1981; 15-19
Mo was estimated by colorimetric method in several samples of different cereals, millets, pulses, oilseeds and vegetables commonly consumed in India. The mean values of Mo content in cereals and millets ranged from 0.162 to 1.050 µg/g, in pulse legumes from 1.540 to 18.86 µg/g, in oilseeds 0.206 to 4.310 µg/g and in vegetables from 0.020 to 1.120 µg/g fresh weight. In the samples of same foodstuff, variations in the Mo content were large. Mo content of milled rice (0.353 µg/g) was about 60% lower than that of unpolished brown rice (1.050 µg/g). On the other hand, the concentration of Mo in whole grain and the hulled product dhal in different food legumes was more or less similar. The Mo intake ranging from 290 to 755 µg/day, in the present Indian diets based mainly on unrefined cereals and millets, would be more than adequate. AA

2753 TESMER (E), LEINERT (J) and HOTZEL (D). Gas chromatographic determination of pantothenic acid in foods.
Nahrung. 24(8); 1980; 697-704 (German)
A method for the determination of pantothenic acid in foods is described. Pantoyl lactone formed by acid hydrolyses of free and bound of pantothenic acid is quantitatively analysed by gas chromatography. Advantages of the method are discussed in comparison with known methods. AA

2754 ARCHER(AW). Stability of aqueous solutions of ascorbic acid prepared for analysis by high performance liquid chromatography.
J. Assoc. Public Anal. 19(Pt.3); 1981; 91-3
The stability of aqueous solutions of ascorbic acid, prepared for analysis by high performance liquid chromatography, is improved by the addition of ethylene-diamine-tetra-acetic acid (EDTA), as the disodium salt. AA

FOOD MICROBIOLOGY

2755 FUNG (DYC). Teaching of automation and rapid methods in food microbiology.
J. Food Prot. 43(9); 1980; 733-5

2756 PEELER (JT), MESSER (JW), LESLIE (JE) and HOUGHTBY (GA). Variation in food microbiological tests used to evaluate analyst performance.
J. Food Prot. 43(9); 1980; 729-32

2757 CARRIZALEZ (V), RODRIGUEZ (H) and SARDINA (I). Determination of the specific growth of molds on semi-solid cultures.
Biotechnol. Bioeng. 23(2); 1981; 321-33

2758 PEPPLER (HJ). Fermentation technology: Past and present.
Cereal Food. World. 26(11); 1981; 609-11

2759 VERES (A), NYESTE (L), KURUCZ (I), KIRCHKNOPF (L), SZIGETI (L) and HOLLO (J). Automated fermentation equipment. I. Program-controlled fermentor.
Biotechnol. Bioeng. 23(2); 1981; 391-404

2760 NYESTE (L), SZIGETI (L), VERES (A), PUNGOR (E) Jr., KURUCZ (I) and HOLLO (J). Automated fermentation equipment. II. Computer-fermentor system.
Biotechnol. Bioeng. 23(2); 1981; 405-17

2761 SHODA (M) and ISHIKAWA (Y). Carbon dioxide sensor for fermentation systems.
Biotechnol. Bioeng. 23(2); 1981; 461-6

YEAST

2762 COOTES (RL) and JOHNSON (R). Continuous propagation of yeast cultures.
Food Technol. Aust. 33(8); 1981; 374-5
A stainless steel yeast propagator with a capacity of 12,000 L was used to continuously produce yeast inoculum for wine fermentations. The propagator was operated manually using a continuous grape juice dosing pump. Cell concentrations of 337 x 10^6 cells/ml were achieved at a dilution rate of 0.04 h^{-1}, that is, 9600 L of yeast inoculum were produced in 24 hour from the propagator with a working volume of 9800 L. This is sufficient yeast inoculum for a winery with a grape intake of 600 t/day. AA

2763 LIN (Y). Formulation and testing of cupric sulphate medium for wild yeast detection.
J. Inst. Brew. 87(3); 1981; 151-4

2764 MOSQUEIRA (FG), HIGGINS (JJ), DUNNILL (P) and LILLY (MD). Characteristics of mechanically disrupted baker's yeast in relation to its separation in industrial centrifuges.
Biotechnol. Bioeng. 23(2); 1981; 335-43

2765 PACA (J). Reserve carbohydrate metabolism and cell survival in aerobically starving baker's yeast.
J. Inst. Brew. 87(3); 1981; 147-50

2766 PACA (J) and SIGLER (K). Metabolic responses of baker's yeast to glucose addition during aerobic starvation.
J. Inst. Brew. 87(3); 1981; 163-8

2767 AOKI (H) and NAGAMORI (N). Emulsifying properties of single-cell proteins.
J. Jpn. Soc. Food Sci. Technol. 27(11); 1980; 550-57 (Japanese)
The emulsifying properties of three kinds of *Candida utilis*: 1) grown on *n*-paraffin (NP-yeast) 2) grown on acetic acid (KN-yeast), and 3) grown on sulphite liquor (SL-yeast) were studied in comparison with those of soy protein. The emulsion stability (ES) and emulsifying capacity of protein isolates prepared from these yeasts by alkaline extraction were superior to those of soy protein, especially in the slightly acidic region. The ES was in the order of SL-yeast > KN-yeast > NP-yeast soy protein. These results were presumed to depend mainly on the extent of partial hydrolysis caused during protein preparation. Hydrolysate obtained by direct partial hydrolysis of damaged yeast cells using hydrochloric acid indicated a high ES level in the slightly acidic region regardless of the removal of the insoluble fractions. This simple one-step process was significant from the standpoint of actual food utilization of single-cell proteins. AA

MUSHROOM

2768 MAGA (JA). Influence of maturity, storage and heating on the flavour of mushroom (*Agaricus bisporus*) caps and stems.
J. Food Process. Preserv. 5(2); 1981; 95-101
Sensory data indicated that raw caps (*Agaricus bisporus*) had a higher degree of desirable mushroom aroma than raw stems, however, cooked caps and stems were judged to be the same in aroma. Medium sized mushrooms were generally found to have more desirable aroma than small or large mushrooms. Storage for up to 7 days was detrimental to raw and cooked cap and stem aromas. Gas chromatographic analysis revealed that the level of 1-octen-3-ol and 1-octen-3-one increased with maturity, storage and cooking with higher levels of both found in the caps as compared to the stems. Correlation of sensory and analytical data indicate that 1-octen-3-ol is associated with desirable mushroom aroma whereas 1-octen-3-one is not. Information of this type should be useful in the harvesting and distribution of mushrooms. AA

FOOD ADDITIVES

2769 LIPINSKI (G-WR) and LUCK (E). Plain man's guide to additives.
Food Manuf. 56(5); 1981; 51-7

2770 MILLO (L). Food additives prior to the law. Situation in Spain.
Rev. Agroquim. Tecnol. Aliment. 29(1); 1980; 39-44 (Spanish)

2771 LUCK (E) and RYMON LIPINSKI (GW). Food additives. A present day description and evaluation.
Dtsch. Lebensmittel-Rundschau. 76(10); 1980; 339-43 (German)
Definition of the term "Food additive"; hygienic aspects of the food additives; formation of a new food additive, The four major groups: 1) additives with nutritive and dietetic functions, 2) additives with stabilized functions, 3) additives with sensory functions and 4) processing and handling aids and practical uses have been discussed in this article. VR

2772 THUMANN (I) and HERRMANN (K). The antioxidant effect of hydroxycinnamic acids and hydroxybenzoic acids.
Dtsch. Lebensmittel-Rundschau. 76(10); 1980; 344-8 (German)
The antioxidant activity of hydroxycinnamic and hydroxybenzoic acids on lard (25 mg/100 g) has been evaluated using various conditions. Our experiments showed that the antioxidant effect increases with the presence of number of OH groups on the aromatic ring of phenol. Cumaric and monohydroxy benzoic acids have only slightly antioxidant properties; the activity increases in the order meta-, ortho-, and para-compound. 3,5-Dimethoxy-4-hydroxy benzoic and cinnamic acid are more effective than the corresponding 3 methoxy-4-hydroxy compounds. A strong inhibition is obtained by gallic, phloroglucinic, caffeic and gentisic acids. AA

2773 ANON. Monosodium glutamate (MSG).
Food Trade Rev. 51(2); 1981; 61,63-4,67-71
A scientific status summary by the Institute of Food Technologists' Expert Panel. Aspects covered include toxicity studies; effect on foetus and young child; glutamate and the central ner-

vous system; safety on feeding; the Chinese Restaurant Syndrome, and other dietary aspects and regulatory status. KAR

2774 COOPER (P). MSG. Mainly reproductive effects.
Food Cosmet. Toxicol. 19(4); 1981; 503-7

2775 DURAN (L). Colour in food technology.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 1-12 (Spanish)
The review covers: colour radiation, colour-object, and colour-sensation; measurement of colour, both sensory and instrumental tri-stimulus photo-colorimetry; measurement of the colour of translucent products; and automatic selection by colour. KMD

2776 FRANCIS (FJ). Natural food colourants.
Cereal Food World 26(10); 1981; 565-7
Includes natural red colourants; yellow and orange colourants and miscellaneous colourants. KAR

2777 KISHIHARA (S), FUJII (S) and KOMOTO (M). The effect of pH on flux and rejection of colouring matters on ultrafiltration of caramel colour.
J. Jpn. Soc. Food Sci. Technol. 27(10); 1980; 479-82
The effect was examined on ultrafiltrability of caramel solution of the change in pH due to addition of sulphuric acid or sodium hydroxide. 10% caramel solution of which pH was adjusted to the range from 1 to 13 was ultrafiltered to measure the flux and the rejection of colouring matter. The flux was almost constant over the pH range from 3 to 12, and progressively decreased below pH 3 and above pH 12. The rejection of colouring matter varied little within the pH range from about 2.5 to 7, progressively increased below pH about 2.5, and progressively decreased above pH 7. These results showed that for releasing the bound imidazole compounds, addition of an adequate amount of sulphuric acid is desirable to avoid the excessive reduction of flux and rejection of colouring matters. AA

2778 NAKAYAMA (S), SHIRAKAWA (T) and OHNISHI (T). Utilization of slimy polysaccharide produced by acetic acid bacteria.
J. Jpn. Soc. Food Sci. Technol. 27(8); 1980; 377-80
The utilization of slimy polysaccharide as food additive produced by *Acetobacter xylinum* during vinegar production was investigated. The slimy polysaccharide did not show viscosity reduction when dissolved in 0~20 w/v % NaCl solution, treated with red pepper extract containing various enzymes and kept at 80 C for an hour, or at pH range 5.0~11.0, while viscosity of commercial slimy materials such as CMC-Na and tamarind seed gum decreased by treatment with red pepper extract for 2 days. Sensory test showed that addition of 0.1~0.2 w/v% of slimy polysaccharide to soy sauce for fillet to raw fish and of 0.05~0.15 w/v% to processed vinegar for "sushi" gave favourable result. Viscosity of soy sauce and vinegar fortified with the slimy polysaccharide did not decrease after keeping at 30 C for 30 days. AA

CEREALS

2779 NELSON (SO). Review of factors influencing the dielectric properties of cereal grains.
Cereal Chem. 58(6); 1981; 487-92

Discusses: dielectric properties; dielectric properties of grain (dependence on frequency, moisture content, density, temperature and other factors, variability); dielectric property values; and conclusions. BSN

2780 OOMAH (BD), REICHERT (RD) and YOUNGS (CG). Quantitative comparison between carborundum stones and resinoid disks in dehulling cereal grains.
Cereal Chem. 58(6); 1981; 492-6
By using the resinoid disks and fine-grit stones, selective removal of the outer layers of cereal kernels became possible, with the result that a higher extraction rate and an acceptable flour colour could be obtained. BSN

2781 FROLICH (W) and ASP (N-G). Dietary fibre content in cereals in Norway.
Cereal Chem. 58(6); 1981; 524-7
The dietary fibre (sum of nondigestible polysaccharides and lignin) values of cereals in Norway are: wheat flour, 3.6%; whole grain wheat flour, 14.4%; wheat bran type I (including both outer layers and germ) 52.2%; wheat bran type II (almost only outer layers), 59.3%; and whole-grain rye flour, 16.8%. BSN

2782 ENDO (S), NAGAO (S) and TANAKA (K). Interpretation of Do-Corder curves. Identification of flour components influencing curve characteristics.
Cereal Chem. 58(6); 1981; 538-42

RICE

2783 JULIANO (BO), PEREZ (CM), BARBER (S), BLAKENEY (AB), IWASAKI (TA), SHIBUYA (N), KENEASTER (KK), CHUNG (S), LAIGNELET (B), LAUNAY (B), DEL MUNDO (AM), SUZUKI (H), SHIKI (J), TSUJI (S), YAMA (JT), TATSUMI (K) and WEBB (BD). International cooperative comparision of instrument methods for cooked rice texture.
J. Texture Stud. 12(1); 1981; 17-38
The texture of 10 milled rices cooked by a standardized method in excess water was measured in 11 laboratories using various instrument methods that had been developed specifically for national samples. The samples selected represented a wide range of rice textures. Instrument indexes for hardness and stickiness of cooked rice generally were more sensitive than the corresponding taste panel scores in discriminating among the 10 cooked rice samples. Instrument indexes for hardness correlated positively among each other as did those for stickiness. Most hardness indexes showed significant negative correlation with stickiness indexes. Most hardness indexes were positively correlated with amylose content whereas stickiness indexes were negatively correlated with amylose content. The continued use of amylose content as an index of eating quality in a rice breeding program is justified. AA

2784 TABEKHIA (MM) and TOMA (RB). Crude protein and amino acid compositions of three California rice varieties.
Nutr. Rep. Int. 23(5); 1981; 805-11

2785 PILLAIYAR (P). Rice bran as feed and food.
Indian J. Nutr. Dietet. 18(3); 1981; 109-15
Aspects covered include, potentiality for nutrients in bran, full fat bran for food and other uses, defatted bran as feed, rice

bran as feed, rice bran oil, bran protein, bran protein isolate/ concentrate, vitamin in bran, fibres in bran and preparation of protein-vitamin rich flour from bran. BSN

2786 CHEN (PH), CHANG (KT) and LU (YD). Polychlorinated biphenyls and polychlorinated dibenzofurans in the toxic rice-bran oil that caused PCB poisoning in Taichung.
Bull. Environ. Contam. Toxicol. 26(4); 1981; 489-95

WHEAT

2787 SEIBEL (W). International situation with durum wheat in the crop years 1978/79 and 1979/80.
Getreide-Mehl. Brot. 34(8); 1980; 197-9 (German)

2788 CHRISTIANSON (DD), HODGE (JE), OSBORNE (D) and DETROY (RW). Gelatinization of wheat starch as modified by xanthan gum, guar gum, and cellulose gum.
Cereal Chem. 58(6); 1981; 513-7

2789 BATEY (IL) and GRAS (PW). Solubilization of wheat gluten with sodium hydroxide.
J. Food Technol. 16(5); 1981; 561-6
The solubility of wheat gluten may be increased greatly by treatment with 0.25 M sodium hydroxide. At temperatures of 40 C and above, the solubility of the protein exceeds 100 mg/ml in a reaction time of 6 hours or less. The products from the reaction of 60 C and 80 C were darker than the original gluten and had an unpleasant odour of H_2S on dissolution in water. They also contained traces of lysinoalanine. The 40 C reaction product was about the same colour as gluten, and its solutions in water did not smell of H_2S. Reaction of gluten at 20 C also caused a large increase in solubility, but after 24 hours the solubility was only 77 mg/ml. This product was also of the same colour as gluten, and did not smell of H_2S in solution. Neither the 20 C nor the 40 C products contained detectable traces of lysinoalanine. For reasons of flavour, colour, lysinoalanine content and economy of time, the optimum reaction conditions are 6 hours at 40 C. AA

2790 LASZTITY (R), VARGA (J) and BEKES (F). Recent results in the investigation of some low molecular weight proteins of Hungarian wheats.
Getriede-Mehl Brot. 34(8); 1980; 199-203 (German)
Investigations on lipopurothionin complex and on gluten fractions of low molecular weights have been reported. Purothionin is extracted as a lipoprotein complex from flour with petroleum ether. α- and β-purothionin are distinguished from each other on the basis of the gel electrophoretic mobility. In the experimental investigations, the focus is on isolation and fractionation of glutens of low molecular weight. KMD

2791 SANKARA RAO (DS) and DEOSTHALE (YG). Mineral and trace element composition of wheat and wheat flours of different extraction rates.
J. Plant Food. 3(4); 1981; 251-7
Grain samples of hard, soft and durum wheat varieties grown under identical agroclimatic conditions and the samples of 70,80, 90 and 100% extraction flours of five hard wheat varieties were analysed for total ash, Ca, P, Mg, Fe, Zn, Cu, Mn, Mo and Cr contents. Varietal differences were significant for Zn, Mn, Mo and

Cr in hard wheats and for Fe, Zn and Mo in durum wheats. In soft wheats, varietal differences were not significant for any of the nutrients analysed. Significant positive correlations were observed between Cu and Cr, and both these elements in turn were positively correlated with Ca, Fe, Mn and Mo. Zn was significantly correlated with total ash, Mn and Mo; P with total ash and Mn, and Ca with Mn. Among the three types, durum wheats were rich and hard wheats were poor in mineral and trace element content. In the wheat flours, lowering the rate of extraction resulted in the decrease in the concentration of all the nutrients. In the flour of 90% extraction, the relative losses ranged from 6.6% in iron to 60% in chromium; in the flour of 80% extraction, the losses were 16.1% in calcium to 66% in chromium and in the flour of 70% extraction, 16.1% in calcium to 76% in chromium. AA

2792 EVANS (DE) and DERMOTT (T). Dosage-mortality relationships for *Rhyzopertha dominica* (F) (Coleoptera: Bostrychidae) exposed to heat in a fluidized bed.
J. Stored Prod. Res. 17(2); 1981; 53-64

Batches of wheat containing immature *Rhyzopertha dominica* were heated in a fluidized bed to examine the influence of air inlet temperature, bed depth and grain temperature on the exposure time needed for a given level of mortality. With a bed depth of 160 mm, raising inlet temperature from 60 to 80 C decreased the $LT_{99.9}$ for *R. dominica* from 16.1 to 3.25 minutes corresponding values for 20 mm beds were 1.92 and 0.54 minutes. For a given bed depth, $1/LT_{99.9}$ was linearly related to inlet temperature. With inlet temperatures of 80 to 90 C, LT values were linearly related to bed depth over 40 to 160 mm. By contrast, LT value and bed depth were not linearly related at lower temperatures. With beds of 40 to 160 mm, the grain temperature associated with 99.9% mortality ranged from 57.1 to 64.0 C and varied with inlet temperature but not, generally, with bed depth. Heating grain to 56-57 C and allowing it to soak, unfluidized, before cooling increased mortality from about 50 to > 99%. Four other species of stored product beetle suffered complete mortality when subjected to a treatment expected to yield 99.9% mortality of *R. dominica*. The experimental results are discussed in terms of heating strategies, heat recovery and the choice of optimal bed depth. AA

2793 EVANS (DE). The influence of some biological and physical factors on the heat tolerance relationships for *Rhyzopertha dominica* (F.) and *Sitophilus oryzae* (L.) (Coleoptera: Bostrychidae and Curculionidae).
J. Stored Prod. Res. 17(2); 1981; 65-72

The influence of several biological and physical factors on the exposure time required to obtain a given level of mortality of immature *Rhyzopertha dominica* and *Sitophilus oryzae* exposed to air at 70 or 80 C in a fluidized bed of wheat was determined. The tolerances of five Australian populations of *R. dominica* differed little. In this species, median tolerance and variance increased as the age span of the exposed insects widened from 0-7 to 0-35 days. Acclimation of *R. dominica* at 22 or 32 C and *S. oryzae* at 15 or 30 C before exposure had no appreciable influence on heat tolerance. Changing the initial grain temperature from 32 to 22 C did not alter LT values for *R. dominica*. However, the $LT_{99.9}$s for both warm and cold acclimated *S. oryzae* in 15 C grain were greater than those in 30 C grain. The $LT_{99.9}$s for *R. dominica* in wheat of 14% m.c. exceeded those in 11.3% m.c. wheat.

Heating curves showed that the time taken for cold or moist grain to reach a given high temperature was extended. AA

2794 MURTHY (PBK). SCE in monkeys fed irradiated wheat.
Food Cosmet. Toxicol. 19(4); 1981; 523

2795 UEDA (S), AMANO (E), KADOTO (C), FUJIMA (M), MAKINO (M), YOSHIZAWA (M) and KUWABARA (Y). *Bacillus* Spp. from wheat flour and flour products.
J. Jpn. Soc. Food Sci. Technol. 27(9); 1980; 453-5 (Japanese)
The microbiological surveys were made on commercial wheat flour, breadcrumbs, and processed or seasoned flour products such as french frying powder cake mixes and so on. The microbial counts in wheat flour were less than 10^4/g, while bread crumbs particularly moist crumbs, were contaminated with considerably high counts of bacteria and fungi. Constituents of bacterial flora were different among each products. It was shown that large numbers of bacilli were detected from processed flour products at a high frequency, while *cocci* were frequently isolated from most crumbs. Among 343 *Bacillus* isolates from most samples, 32.4% were *B. subtilis*, 33.5% *B. licheniformis*, 14% *B. cereus*, and 9.6% *B. pumilus*. *B. subtilis* and *B. licheniformis* were common in many of flour staples and *B. cereus* was recovered from half of processed flour product samples. AA

OAT

2796 KIRLEIS (AW), SOMMERS (LE) and NELSON (DW). Heavy metal content of groats and hulls of oats grown on soils treated with sewage sludges.
Cereal Chem. 58(6); 1981; 530-33

RYE

2797 SEIBEL (W) and STEPHAN (H). Processing value of milled rye products - evaluation of rye-baking tests.
Getriede Mehl. Brot. 34(8); 1980; 203-6 (German)

MILLETS

2798 PARAMAHANS (SV), WANKHEDE (DB) and THARANATHAN (RN). Studies on varagu starch.
Starch. 32(4); 1980; 109-12
Starch has been isolated from the millet varagu at 63% yield. Study of the physical properties revealed; moderate swelling and low solubility power in water; extensive solubility in dimethyl sulphoxide, probably indicative of easy solvent penetration due to labile and heterogeneous bonding forces within the granule. Brabender amylogram indicated little retrogradation on cooling, owing to strong bonding between the linear and branched molecules of starch. The amylose content of the starch was 24% as determined by paper chromatographic fractionation and "Blue value" method. AA

SORGHUM

2799 ABDELRAHMAN (AA) and FARRELL (EP). Grits from grain sorghum dry milled or roller mills.
Cereal Chem. 58(6); 1981; 521-4
Lower fat and ash contents were produced in grits on dry milling of sorghum with a prebreak system. Yields of brans and fines (-30 LW) increased and the amount of grits increased, as temper moisture increased. Maximum yield with low fat content was obtained with tempering treatment of 17% moisture for 8 hours. BSN

MAIZE

2800 ESEN (A), BIETZ (JA), PAULIS (JW) and WALL (JS). Fractionation of alcohol-soluble reduced corn glutelins on phosphocellulose and partial characterization of two proline-rich fractions.
Cereal Chem. 58(6); 1981; 534-7

2801 PAULIS (JW). Disulphide structures of zein proteins from corn endosperm.
Cereal Chem. 58(6); 1981; 542-6

2802 CLUSKEY (JE), KNUTSON (CA) and INGLET (GE). Fractionation and characterization of dent corn and amylomaize starch granules.
Starch. 32(4); 1980; 105-9
Commercial dent waxy maize and amylomaize V and VII starches have been fractionated according to granule size by an aqueous differential sedimentation procedure. Granule fractions were analyzed for iodine binding capacities as an indication of apparent amylose content. Approximately three-fourths of the dent corn granules were classifed into the spherical shaped group and one fourth into the ellipsoidal category. Waxy maize starch granules are more angular than those from normal dent corn starch. They had an unfractionated average size of 12 µ with fractions varying from 15 to 8 µ. The normal dent corn yielded fractions varying from 15 to 6 µ. Amylomaize VII granules measured 8 µ with fractions varying between 12 and 5 µ. Results showed an inverse relationship between granule size and iodine binding capacity in the amylomaizes. In amylomaize V fraction (A) the largest granules had an apparent amylose content of 40% while the smallest contained 52%. As the average granule size decreases in each of the measured shape categories, the apparent amylose value of the amylomaize starch increases. VR

2803 KUHLMANN (F). Determination of carbendazine residues by means of high pressure liquid chromatography.
Dtsch. Lebensmittel-Rundschau. 76(10); 1980; 351-3 (German)
In the aforementioned essay a method of determining residues of carbendazine in corn (the entire plant, grain, straw) by means of high pressure liquid chromatography has been described. The determination limit lies at 0.05 ppm. AA

PULSES

2804 CALOV (C) and DURAN (L). Measurement of turbidity of covering liquid in canned peas.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 144-8

Turbidity of covering liquid is one of the factors contributing to commercial quality of canned peas. Based on the sensory evaluation of this attribute by means of a Hehner cylinder, as the reference, it is found that determination of reflectance value at 650 nm, measured on a 11.2 mm layer of liquid over white background, is a good instrumental parameter to evaluate turbidity of liquid. AA

2805 KON (S) and BURTEA (O). Process development adds scope to bean products.
Ind. Aliment. 19(177); 1980; 845-6 (Italian)

2806 JYOTHI (E) and REDDY (PR). The effect of germination and cooking on the *in vitro* digestibility of starch in some legumes.
Nutr. Rep. Int. 23(5); 1981; 799-804

In vitro digestibility of starch of black gram, chick pea, green gram, horse gram, red gram and cow pea was studied. The ungerminated and germinated legumes for 12, 24, 36 and 48 hours were subjected to α-amylolysis. Roasting and boiling were employed to see the effect of cooking on starch digestibility. A progressive increase in the digestibility of legumes was observed with increasing periods from 0 to 12, 24 to 36 hours of germination and an optimal digestibility was noticed at 36 hours of germination. At the zero hour, where the raw legume was not subjected to α-amylolysis, the yield of maltose showed a general increase with the increasing periods of germination upto 48 hours. Cooking enhanced the digestibility of starch over that observed with raw legumes. Among the legumes studied, cow pea is found to be the best legume with regard to digestibility compared to other legumes. The next best legume is green gram, followed by chick-pea, horse gram, black gram and red gram. AA

2807 JANABAI GIRI, PARVATHAM (R) and SANTHINI (K). Effect of germination on the levels of pectins, phytins and minerals in three selected legumes.
Indian J. Nutr. Dietet. 18(3); 1981; 87-91

This study indicates that ash content decreased during germination and mineral content remains constant. The pectin content increases in green gram and horse gram and decreases in red gram. The phytin content decreases in all the three legumes. It is clear from this study that germination is a simple method of food processing which results in increase of nutritive value. It decreases phytin phosphorus level and increases the availability of Fe and Ca. Pectin is responsible for hardness of legumes. Increase in pectin level in green gram and horse gram may increase the cooking time and decrease in pectin level of red gram may decrease the cooking time of the germinated legumes. BSN

2808 ESCARDINO (A), MONTON (J) and FONT (R). Dehydration of leguminous seeds. III . Kinetic study of bean drying.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 112-24 (Spanish)

Drying with counter current air circulation of previously blanched and frozen beans has been studied. We have worked at four temperatures 40,50,60,70 C, and at different air flows. The experiments were made at constant operation conditions. Equations relating the mean moisture of the bean seeds with the drying time and the operation conditions have been obtained. AA

2809 ALLI (I) and BAKER (BE). Constitution of leguminous seeds. The effect of some physico-chemical factors on the yield of proteins isolated from *Phaseolus* beans.

J. Sci. Food Agric. 32(5); 1981; 503-7
The yields of acid soluble proteins isolated from white kidney beans (*Phaseolus vulgaris*), navy beans (*P. vulgaris*) and baby lima beans (*P. lunatus*) were determined under different conditions of extraction. Highest yields of protein material were obtained when malic acid solutions (0.4M (pH 3.5) white kidney bean and navy bean; 0.05M (pH 3.5) baby lima bean) were used and under the following conditions: shaking time 20-30 minutes, extraction temperature 40-45 C; particle size 0.50-1.00 mm. AA

2810 BILIADERIS (CG), GRANT (DR) and VOSE (JR). Structural characterization of legume starches. I. Studies on amylose, amylopectin, and beta-limit dextrins.
Cereal Chem. 58(6); 1981; 496-502

2811 BILIADERIS (CG), GRANT (DR) and VOSE (JR). Structural characterization of legume starches. II. Studies on acid-treated starches.
Cereal Chem. 58(6); 1981; 502-7

2812 ESKIN (NAM), JOHNSON (S), VAISEY-GENSER (M) and McDONALD (BE). A study of oligosaccharides in a select group of legumes.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 40-42

2813 GEERVANI (P) and THEOPHILUS (F). Evaluation of protein quality of some processed legumes by nitrogen balance studies on pre-school children.
Nutr. Rep. Int. 23(2); 1981; 279-86
A nitrogen balance study was carried out on pre-school children, with home processed legumes as sole source of protein in the diet. The five processed legumes used were boiled red gram dhal (*Cajanus cajan*), green gram dhal (*P. aureus*) and bengal gram dhal (*Cicer arietinum*) and roasted green gram dhal and Bengal gram dhal. The digestibility coefficient of boiled dhals was significantly ($P < 0.05$) higher than the corresponding roasted dhals. The nitrogen retention was highest for Bengal gram diets, closely followed by green gram and red gram diets. AA

2814 HETTIARACHCHY (NS) and SRIKANTHA (SS). Trypsin inhibitor and phytohaemagglutinin contents in the seeds of six legumes commonly consumed in Sri Lanka.
J. Nat. Sci. Counc. Srilanka. 9(2); 1981; 269-72

2815 KON (S) and SANSHUCK (DW). Phytate content and its effect on cooking quality of beans.
J. Food Process. Preserv. 5(3); 1981; 169-78
Storage of dry beans under conditions of relatively high moisture and temperature increased the cooking time of the beans about 5-fold. Among the changes that occur in beans stored this way, the reduction (about 65%),in phytic acid content was the best indicator of increased cooking time. Cooking times of various legumes studied correlated well with the ratio of % phytic acid/% Ca present in the beans. Soaking high moisture beans in a solution of either phytic acid or EDTA reduced cooking time to that of control beans. Cooking time of control beans soaked under the same conditions was reduced by between 1/3 and 1/2, depending on the solution used. AA

CHICK PEA

2816 JAYA (TV) and VENKATARAMAN (LV). Influence of germination on the carbohydrate digestibility (*in vitro*) of chick pea (*Cicer arietinum*) and green gram (*Phaseolus aureus*).
Indian J. Nutr. Dietet. 18(2); 1981; 62-8

The *in vitro* amylolysis of ungerminated and germinated chick pea and green gram was studied using various enzymes. The legume samples were incubated with α-amylase, β-amylase, pancreatin or pancreatic amylase. The effect of HCl, or HCl-pepsin preincubation (prior to amylolysis) was also studied. Starches were isolated from the ungerminated and germinated chick pea and green gram and were incubated with α-amylase and β-amylase and the hydrolytic products were resolved using paper chromatography, identified and quantitated. Germination upto 48 hours improved the carbohydrate digestibility, while the 96 hours germination did not have any effect. Digestibility was better when the legumes were treated with β-amylase than when they were treated with α-amylase. HCl pepsin preincubation improved the digestibility. When starches isolated from chick pea were treated with α-amylase, there was alteration in the relative proportion of end products as a result of germination, whereas in the case of green gram, the relative proportion of end products did not alter. BSN

2817 SHARMA (RD). Isoflavone content of Bengalgram (*Cicer arietinum*) at various stages of germination.
J. Plant Food. 3(4); 1981; 259-64

Effect of germination, varietal differences and boiling on the isoflavone content of Bengalgram (*Cicer arietinum*) was studied. The amount of isoflavone in seeds was found to increase with the duration of germination. A considerable difference in the contents of isoflavones in the various varieties of Bengalgram was noted. Boiling of germinated seeds for 10 minutes under 15 lb pressure resulted in about 50% loss of biochanin A and formononetin. The isoflavone profile of other commonly-used pulses showed that, while blackgram and greengram contained only daidzein, redgram and soyabean continued formononetin and genestein respectively along with daidzein. AA

2818 CAYGILL (JC), JONES (JA) and FERBER (CEM). Imitation milks from *Cicer arietinum* (L), *Vigna unguiculata*(L.) Walpers and *Vigna radiata* (L.) Wilczek and other legumes.
J. Sci. Food Agric. 32(6); 1981; 601-7

Vegetable milks were prepared in the laboratory from mung bean (*Vigna radiata* (L.) Wilczek), cow pea (*Vigna unguiculata*(L.) Walpers) and chick-pea (*Cicer arietinum*(L.)) by homogenisation of a filtered aqueous extract of the ground legume with soyabean oil. Emulsions stable to pasteurisation were made from the first two. Pigeon pea (*Cajanus cajan*(L.)) and black gram (*Vigna mungo* (L.) Hepper) were found to be unsuitable as bases for milks prepared by simple processing. The nitrogen, oil, sugar and ash contents of the first three legumes, and of milks prepared from them, were determined. Imitation milks are intended to resemble animal milks nutritionally, and whilst the contents of potassium and phosphorus were acceptable, these vegetable milks were low in sodium, calcium and zinc. The trypsin inhibitory activity, whilst low in comparison with soya milk, was partially stable to pasteurisation. The amino acid composition indicated that it would be desirable to complement legume proteins with cereal proteins to prepare vegetable milks. AA

REDGRAM

2819 DEOSTHALE (YG) and SANKAR RAO (DS). Mineral and trace element composition of redgram (*Cajanus cajan*).
Indian J. Nutr. Dietet. 18(4); 1981; 130-35

Twenty five samples of redgram obtained from three locations were analysed for total ash, P, Ca, Fe, Cu and Mo content. Variations in the levels of all these nutrients were large, but varietal differences were significant only in case of Ca content of the samples obtained from Delhi, and Fe and Mo content of the varieties from Akola. In redgram varieties grown at Rajendranagar in the 1978 season, varietal differences were significant for Mg, Fe, Mo and Cr. Also, varieties grown in 1978 season contained significantly ($P < 0.001$) higher levels of Ca and Me than did varieties grown in 1973 at this location, suggesting the existence of seasonal variations. Differences in mean values for all the nutrients in redgram varieties grown at three locations, namely, Rajendranagar, Akola and Delhi were found to be significant. These observations suggest that apart from genetic factors, the environmental factors such as location and season also had considerable influence on the mineral and trace element composition of redgram. BSN

BROADBEAN

2820 NASH (MJ) and FRANKLIN (MF). Comparative studies on the artificial drying of normal and semi-naked beans (*Vicia faba* L.)
J. Stored Prod. Res. 17(2); 1981; 77-82

Small-scale tests were carried out to compare the drying behaviour of beans (*Vicia faba* L.), which had been bred with part of the seed coat missing, with that of normal beans possessing intact testas. Results showed drying behaviour for the 'semi-naked' and normal types to be similar, irrespective of whether the drying was started when the beans were very moist at 35-45% moisture content or moderately moist at around 20% moisture content. AA

MUNG BEAN

2821 SHEHATA (AAY) and THANNOUN (AM). Preparation of protein isolates from Iraqi mung beans with their chemical, nutritional and solubility characteristics.
J. Plant Food. 3(4); 1981; 265-73

The precipitation profile of Iraqi mung bean proteins indicated that 97.3% of the extracted nitrogen could be precipitated at pH 4. At this pH, two protein isolates were prepared; the laboratory (85.0% protein) and the pilot plant (79.2% protein). The isolation process resulted in appreciable increases in phosphorus, calcium and iron contents of the isolates. Their amino acid composition indicated high contents of lysine (over 7.5 g/100g), low contents of methionine (less than 1.5 g) and good proportions of most other essential amino acids. The solubility profiles though different, had comparable general trends (maximum solubilities at pH 11 or higher and at pH 2) with minimum solubilities at pH 4. Their pepsin-trypsin *in vitro* digestibilities were higher than those of the proteins in their parent flour. AA

WINGED BEAN

2822 EKPENYONG (TE) and BORCHERS (RL). Effect of processing on some nutritional properties of the protein of winged bean.
Nutr. Rep. Int. 23(5); 1981; 877-85
Processing of winged bean by different methods (roasting, autoclaving, long and quick-cooking) causes some modification in its chemical composition. Heat inactivates the trypsin inhibitors thereby improving the digestibility. The amino acid composition is not significantly affected by duration of hydrolysis. Autoclaving had both beneficial and detrimental effects on the liberation of amino acids. The S-amino acids were increased due to the inactivation of the trypsin inhibitors. Lysine, histidine, leucine, arginine and glutamic acid decreased with autoclaving. It is speculated that higher temperatures and prolonged heating could cause a loss in protein quality due mainly to a decrease in available lysine. AA

2823 SRIKANTHA (SS) and HETTIARACHCHY (NS). Phytohaemagglutinins in the winged bean *Psophocarpus tetragonolobus* L.DC.
J. Nat. Sci. Counc. Sri Lanka. 9(2); 1981; 223-8
Seeds from eleven cultivars of *Psophocarpus tetragonolobus* L. were screened for phytohaemagglutinin activity. The levels ranged from 3,200 to 25,600 haemagglutinating units/g sample, on a fresh weight basis. Tubers and leaves of two indigenous cultivars tested, also showed the presence of phytohaemagglutinins, but at a lower profile in comparison to that of seeds. Soaking the seeds for a ten-hour period does not seem to have any influence in decreasing the levels of this anti-nutritional factor. But phytohaemagglutinins present in the winged bean seeds were found to be thermolabile. AA

2824 HILDEBRAND (DF), HETTIARACHCHY (NS), HYMOWITZ (T) and ERDMAN (JW) Jr. Electrophoretic separation and properties of winged bean seed trypsin inhibitor.
J. Sci. Food Agric. 32(5); 1981; 443-50
Separation of the major trypsin inhibitor protein from crude extracts of winged bean seeds (WBTi) was accomplished using a cathodic polyacrylamide disc gel electrophoretic system. The molecular weight of the WBTi protein was determined to be about 20,000. Winged bean seed extracts showed trypsin-inhibiting (Ti) activity similar to soyabean seed extracts, but large genotypic differences of the Ti activity in winged beans were found. Preliminary studies on the effects of processing on WBTi indicate that aqueous extracts of WBTi are at least as heat-labile as the Ti of aqueous extracts of soyabean seeds. Autoclaving winged bean seed meal prior to protein extraction resulted in considerable reduction of protein solubility. AA

2825 EKPENYONG (TE) and BORCHERS (RL). Some toxic factors in winged bean seeds. 1. Antitrypsin hemagglutinating and urease activities.
Nutr. Rep. Int. 23(5); 1981; 865-70
Winged bean, like most legumes, contains trypsin inhibitor hemagglutinating activity but no urease activity. Raw winged bean seeds contain 52.5 and 57.5 TIU/mg sample. Extracts from raw seeds caused sedimentation of suspended cells. Injection of crude extracts caused localized dermal inflammation. Feeding of raw beans caused pancreatic hypertrophy, low liver weight and growth retardation. Autoclaving the winged bean seeds destroys these toxic factors, improves food acceptability and protein digestibility. AA

HARICOT BEAN

2826 HILL (J) and SCHOONHOVEN (AV). Effectiveness of vegetable oil fractions in controlling the Mexican bean weevil on stored beans.
J. Econ. Entomol. 74(4); 1981; 478-9
Vegetable oil at a dosage of 1 ml/kg bean seed, *Phaseolus vulgaris* (L.), showed insecticidal effectiveness against *Zabrotes subfasciatus* (Boheman) infesting stored beans. The active oil fraction appeared to be the triglyceride component. Oleic acid appeared to be the only effective fatty acid in oils tested. Linolenic and arachidonic acid showed some insecticidal effect. AA

AFRICAN LOCUST BEAN

2827 ODUNFA (SA). Microorganisms associated with fermentation of African locust bean (*Parkia filicoidea*) during *iru* preparations.
J. Plant Food. 3(4); 1981; 245-50
Microorganisms associated with fermentation of *iru* were isolated from samples prepared in the traditional way. The predominant organisms were *Bacillus subtilis* and *Staphylococcus* spp. The morphological and biochemical properties of the isolates are described. The temperature and the pH increased sharply during the fermentation process. AA

OILSEEDS AND NUTS

2828 MAHESHWARI (PN), STANLEY (DW), Van de VOORT (FR) and GRAY (JI). The heat stability of allyl glucosinolate (sinigrin) in aqueous and model systems.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 28-32

SOYABEAN

2829 BAIRD (DG). Dynamic viscoelastic properties of soy isolate doughs.
J. Texture. Stud. 12(1); 1981; 1-16
The linear viscoelastic properties of soy isolate doughs have been determined as a function of flour concentration and temperature using a Rheometrics Mechanical Spectrometer. The material of lowest concentration (15%) which is classified as a dispersion rather than a dough exhibited values of storage (G') and loss moduli (G'') which increased with increasing temperature above 50 C. On the other hand, values of G' and G'' for 20% and 25% doughs showed only a slight increase with increasing temperature. The shape of the G' and G'' versus frequency (ω) curves is suggestive of solid-like behaviour for the doughs. The shape of these curves does not change with temperature which indicates there is very little change in the ability of the protein molecules to undergo configurational rearrangements as the result of heating. The phenomenon of gelation does not arise in the doughs but only in the dispersion of lower concentration. The data indicate that the bonds between protein molecules are noncovalent in nature and that the process of cooking soy dough does not involve the formation of crosslinks. AA

2830 NICHOLS (DJ) and CHERYAN (M). Production of soy isolates by ultrafiltration: Process engineering characteristics of the hollow fiber system.
J. Food Process. Preserv. 5(2); 1981; 103-18

2831 KURECHI (T), KIKUGAWA (K), FUKUDA (S) and HASUNUMA (M). Inhibition of N-nitrosamine formation by soya products.
Food Cosmet. Toxicol. 19(4); 1981; 425-8
Soya products such as Tofu (soyabean curd), soya milk, Miso (soyabean paste) and Bonlact (powdered soya milk with additives) effectively decreased nitrite levels at pH 3 and 4, and inhibited the formation of N-nitrosodimethylamine and N-nitrosodiethylamine. from sodium nitrite, and of the appropriate dialkylamine at gastric pH. These effects may be attributed to the lipids or to the minor phenolics contained in the products. KMD

2832 FRANKEL (EN), FRIEDRICH (JP), BESSLER (TR) and KWOLEK (WF). Hydrogenation of methyl sorbate and soyabean esters with polymer-bound metal catalysts.
J. Am. Oil. Chem. Soc. 57(10); 1980; 349-53

2833 SUGIMOTO (H), NISHIO (M), HORIUCHI (T) and FUKUSHIMA (D). Improvement of organoleptic quality of fermented soyabean beverage by additions of propylene glycol alginate and calcium lactate.
J. Food Process. Preserv. 5(2); 1981; 83-93
A fermented soyabean beverage having a low viscosity, 3.75 c.p. (crude protein, 1.54%, w/v; acidity, 0.57%, w/v as lactic acid) was prepared through a lactic acid fermentation of soymilk with *Lactobacillus casei*. During the fermentation process, an organoleptically undesirable powdery-gritty sensation was developed. This off-taste could be effectively reduced by an addition of propylene glycol alginate (PGA). However, the emulsion stability of the fermented product was sometimes decreased when PGA was added. This defect could be recovered by means of an addition of some mineral salts such as calcium lactate with PGA. As a result, a fermented soyabean beverage with a smoother mouth feel and of organoleptically high value was obtained. AA

2834 AIDOO (KE), HENDRY (R) and WOOD (BJB). Amyloglucosidase and maltase activities in soy sauce fermentations.
J. Food Technol. 16(5); 1981; 543-8

2835 FLEGEL (TW), BHUMIRATANA (A) and SRISUTIPRUTI (A). Problematic occurrence of tyrosine crystals in the Thai soyabean paste tao chieo.
Appl. Environ. Microbiol. 41(3); 1981; 746-51

CANARY SEED

2836 TAKAGI (T) and IIDA (T). Antioxidant for fats and oils from canary seed: Sterol and triterpene alcohol esters of caffeic acid.
J. Am. Oil Chem. Soc. 57(10); 1980; 326-30
Several kinds of seeds used as bird feed were extracted successively with hexane, ether and methanol. In the antioxidant test with extracts, the ether extract from canary seeds showed the highest activity. The antioxidant fraction separated from it by thin layer chromatography showed excellent activity for lard and sardine oil. The effective components were identified by gas chromatography and gas chromatography-mass spectrometry of the hydrolyzed products as the esters of caffeic acid with cycloar-

tenol, gramisterol, sitosterol and campesterol with the minor amounts of 24-methylenecycloartanol, obtusifoliol, brassicasterol and Δ7-stigmastenol. AA

MUSTARD SEED

2837 DATTA (SK). Thin layer chromatographic detection of argemone oil and rapeseed oil in mustard seed oil.
J. Assoc. Public Anal. 19(Pt.3); 1981; 101-3
A quick TLC method has been developed for the separation and identification of both argemone oil and rapeseed oil in mustard seed oil. The sample is dissolved in acetone, spotted on to a silica gel G TLC plate and developed with hexane-acetone solvent system. Argemone oil can be detected by exposing the plate under UV light, whereas rapeseed oil is detected by spraying with Dragendorff's reagent followed by heating the plate to 110 C. This is a very simple, rapid and direct method. AA

2838 FRIJTERS (JER), GRIFFITHS (NM), MATHER (AM), REYNOLDS (J) and FENWICK (GR). Effect of sulphur dioxide on the chemical composition and odour of mustard paste.
Chem. Sense . 6(1); 1981; 33-43
Sulphur dioxide, added as a preservative to mustard paste, has been shown to react with allyl isothiocyanate to produce the adduct - allylaminothiocarbonylsuphonate. This reaction changes the odour properties of the paste, causing a loss of mustard quality and the production of a garlic-like note. These changes have been investigated by the following psychophysical techniques: odour detectability and characterisation, profile analysis and magnitude estimation. The relationships between the concentration of allyl isothiocyanate in the paste, in the headspace above the paste and its sensory intensity have also been studied. AA

RAPESEED

2839 NAKAI (S), HO (L), TUNG (MA) and QUINN (JR). Solubilization of rapeseed, soy and sunflower protein isolates by surfactant and proteinase treatments.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 14-22

2840 El-SHATTORY (Y), DEMAN (L) and DEMAN (JM). Influence of temperature and pressure on hydrogenation of low erucic acid rapeseed oil (Zephyr).
J. Food Technol. 16(5); 1981; 519-25
Low erucic acid rapeseed oil (Zephyr) was hydrogenated at 200, 170 and 140 C and pressure of 48 and 303 kPa. The hydrogenated oils were characterized by determination of the iodine value, trans-isomer content, fatty acid composition, dropping point and solid fat content. From the change in iodine value and trans-isomer content, the specific isomerization index (SII) was determined. The SII was generally lower at high pressure and low temperature. The hydrogenation reaction rate increased with temperature as well as pressure. Selectivity ratios for the hydrogenation reaction were more influenced by pressure than by temperature, the highest selectivity ratios were observed at the lower pressure. AA

2841 El-SHATTORY (Y), DEMAN (L) and DEMAN (JM). Hydrogenation of low erucic acid rapeseed oil (Zephyr) under selective conditions.
J. Food Technol. 16(5); 1981; 527-33
Low erucic acid rapeseed oil (Zephyr) was hydrogenated under selective conditions, 200 C, 48 kPa pressure, with 0.2% of five different commercial nickel catalysts and the standard catalyst of the American Oil Chemists' Society. From the change in iodine value, the relative activities of the catalysts were calculated. The trans-isomer levels were determined by infra-red spectroscopy and the specific isomerization index calculated. Catalysts with the lowest activity resulted in the highest level of trans-isomers. From the change in fatty composition, the selectivity ratio was calculated. Physical properties were measured by determination of dropping point and solid fat content. The commercial catalysts differed widely in their action on the hydrogenation of Zephyr oil. AA

SAFFLOWER

2842 RIISOM (T), SIMS (RJ),and FIORITI (JA). Effect of amino acids on the autooxidation of safflower oil in emulsions.
J. Am. Oil. Chem. Soc. 57(10); 1980; 354-9

SAL

2843 BHATTACHARYA (DK), BHATTACHARYA (S) and SAMADDAR (G). Sal starch in pharmaceutical tablet formulation.
J. Oil Technol. Assoc. India. 13(3); 1982; 112-3
Starch has been isolated from sal seed meal (i.e. deoiled sal seed cake) and its properties have been studied. Sal seed starch resembles maize starch, and hence can replace the latter in the manufacture of pharmaceutical tablets. KMD

2844 NASIRULLAH, MALLIKA (T), RAJALAKSHMI (S), VIBHAKAR (S), KRISHNAMURTHY (MN), NAGARAJA (KV) and KAPUR (OP). Characteristics of sal seed fat.
J. Oil Technol. Assoc. India. 13(3); 1981; 120-22
Sal fat extracted from 14 samples of sal seed collected from Madhya Pradesh and Orissa showed sap. value 175.2-191.55; iodine value 31.5-45.0; butyro-refractometer reading at 40 C, 45.5-54 C; FFA 1.0-2.4%; and slip point 26.0-30.7 C. The main fatty acids were: palmitic 1.7-23.0%; stearic 32.6-56.8%; oleic 31.0-52.3%; linoleic 0.3-5.0% and arachidic 1.0-8.6%. KMD

2845 MUKHOPADHYAY (S) and BHATTACHARYA (DK). Unsaponifiable matter and sterol content of sal, mahua and mango kernel fat.
J. Oil Technol. Assoc. India. 13(3); 1981; 114-5
The range of unsaponifiable matter content is reported to be 0.6-1.3% in sal fat, 1.7-2.3% in mahua fat, and 0.75-1.6% in mango kernel fat. The sterol contents of these fats are: 0.06-0.43% in sal fat, <0.1% in mahua fat and 0.22-0.58% in mango kernel fat. Sal and mango kernel fats contain substantial proportions of SOS glycerides which are useful in formulating cocoa butter substitutes. KMD

2846 BHATTACHARYA (DK) and BANERJEE (K). Plastic fats from sal, mango and mowrah fat by monoester-polyester interchange reaction and fractionation.
J. Oil Technol. Assoc. India. 13(3); 1981; 123-6

Sal and mango fats which are rich in palmitic acid, and mowrah fat, rich in stearic acid, were prepared (interesterified) by a monoester-polyester reaction. After a double-stage fractionation from acetone, mango and mowrah fats had slip point (36-39 C) very similar to that of cocoa butter, but they differed from cocoa butter in other respects. These fats are, however, suitable for use as high stability bakery fats, some kinds of confectionery fats, and tropical margarine. KMD

SESAME

2847 DENCH (JE), RIVAS (N) and CAYGILL (JC). Selected functional properties of sesame (*Sesamum indicum* L.) flour and two protein isolates.
J. Sci. Food Agric. 32(6); 1981; 557-64

Functional properties of sesame flour and protein isolates have been compared with those of some commercial soya products. The sesame products showed better fat absorption, poorer water absorption and overall lower bulk densities than soya products. Emulsifying activities and stabilities were generally lower than soya products. Destabilisation of the emulsion in the presence of NaCl was noted. Sesame products showed better foam expansion, and comparable foam stability and strength to corresponding soya products. Addition of sugar to sesame whips reduced foam expansion and increased foam stability. Acid, neutral and alkaline sesame whips showed distinct whipping properties depending on the product used. Sesame whips resembling those of egg-white could be obtained. The sesame isolate prepared by alkaline extraction was superior to that prepared by salt extraction in terms of their pH-solubility profiles. AA

SUNFLOWER SEED

2848 OSTRIC-MATIJASEVIC (B), TURKULOV (J) and KARLOVIC (D). Quality of sunflower oil bleached during deodorization.
J. Am. Oil Chem. Soc. 57(10); 1980; 323-5

Deodorization of sunflower oil at 200 C yielded a product with a transparency of 78-84% at 455 nm. Processing steps prior to deodorization must be efficient, if one is to obtain an oil of such high transparency. Bleaching during deodorization has an economic advantage over clay bleaching and deodorization. The combined process yields an oil with better stability, higher tocopherol content, and lower conjugated diene content; it can also yield a satisfactory product, starting with sunflower oils of different degrees of oxidation. KMD

CASHEW NUT

2849 OJEH (OA). Effect of refining on the physical and chemical properties of cashew kernel oil.
J. Food Technol. 16(5); 1981; 513-7

TUBERS AND VEGETABLES

BEET

2850 AMIN (A). Gas chromatographic separation and identification of organic acids in beet molasses and date syrup.
Nahrung. 24(8); 1980; 705-11 (German)
Molasses and date syrups were analyzed for some organic acids. Gas chromatographic methods were used to identify the individual acids. The interpretation of results was based on mixing and comparing with indices. Using polar and nonpolar columns, it was possible to correlate between molecular weight, carbon number and boiling point of the acids identified. The chromatographic results showed the presence of lactic, malonic, succinic, glutaric, α-ketoglutaric, tartaric and citric acids in molasses and date syrup in varying quantities as compared to model acids. An unidentified component showed a strong peak in both molasses and date syrup. It is suggested that this particular peak belongs to polycarboxylic acids, with an extra oxygen function. AA

POTATO

2851 BEMILLER (JN) and PRATT (GW). Sorption of water, sodium sulphate, and water soluble alcohols by starch granules in aqueous suspension.
Cereal Chem. 58(6); 1981; 517-20

CASSAVA

2852 MEUSER (F) and SMOLNIK (H-D). Processing of cassava to gari and other foodstuffs.
Starch. 32(4); 1980; 116-22
A new process for gari production has been developed. Cassava roots are peeled mechanically and ground to a mash which is fermented anaerobically. The mash must be washed after fermentation to remove the cyanohydrin. The washed mash is drained, mechanically, and afterwards dried and roasted in a two stage process. The end product gari can be ground to any required granulation size. The remaining hydrocyanic acid content is less than 10 ppm. The product can be stored without any change in taste for more than 1 year with a water content of less than 12%. AA

2853 UEDA (S), ZENIN (CT), MONTEIRO (DA) and PARK (YK). Production of ethanol from raw cassava starch by a nonconventional fermentation method.
Biotechnol. Bioeng. 23(2); 1981; 291-9
Raw cassava root starch was transformed into ethanol in a one-step process of fermentation, in which are combined the conventional processes of liquefaction, saccharification, and fermentation to alcohol. *Aspergillus awamori* NRRL 3112 and *Aspergillus niger* were cultivated on wheat bran and used as Koji enzymes. Commercial *A. niger* amyloglucosidase was also used in this experiment. A raw cassava root homogenate-enzymes-yeast mixture fermented optimally at pH 3.5 and 30 C, for five days and produced ethanol. Alcohol yields from raw cassava roots were between 82.3 and 99.6%. Fungal Koji enzymes effectively decreased the visco-

sity of cassava root fermentation mashes during incubation. Commercial A. *niger* amyloglucosidase decreased the viscosity slightly. Reduction of viscosity of fermentation mashes was 40, 84, and 93% by commercial amyloglucosidase, A. *awamori*, and A. *niger* enzymes, respectively. The reduction of viscosity of fermentation mashes is probably due to the hydrolysis of pentosans by koji enzymes. AA

YAM

2854 IGE (MT) and SUNMONU (KO). An indirect moisture sensor for some tropical farm produce such as yam.
J. Food Technol. 16(5); 1981; 457-67

2855 OBI (SKC). Pectinase activity of anaerobic and facultively anaerobic bacteria associated with soft rot of yam (*Dioscorea rotundata*).
Appl. Environ. Microbiol. 41(3); 1981; 563-7

VEGETABLES

2856 SPLITTSTOESSER (DF) and CORLETT (DA) Jr. Aerobic plate counts of frozen blanched vegetables processed in the United States.
J. Food Prot. 43(9); 1980; 717-9

2857 LEICHTER (J). Folate content in the solid and liquid portions of canned vegetables.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 33-4
The free and total folate content was determined separately in the solid and liquid portions of canned spinach, peas, asparagus and green beans using the *Lactobacillus casei* assay. The liquid portions of the canned vegetables contained folate activities which were comparable to those in the corresponding solid portions when the results are expressed in µg of folate per 100 g portions. The combined total folic acid content in the solid and liquid portions of the vegetables was similar to those in the raw state reported in the literature. The results indicate that discarding of the liquid portion of canned vegetables would entail a significant loss of folic acid. AA

LEAFY VEGETABLES

2858 GOMEZ (MI). Carotene content of some green leafy vegetables of Kenya and effects of dehydration and storage on carotene retention.
J. Plant Food. 3(4); 1981; 231-44
Nutritional surveys carried out in Kenya report vitamin A deficiency and low levels of vitamin A adequacy of diet. Green leafy vegetables being a major source of dietary vitamin A, the current study undertook to screen some commonly consumed varieties for carotene content and to measure retention of carotene in dehydration and storage in selected species. The results indicated that some wild species, and leaves of other food crops such as cassava, bean and Irish potato that are consumed as leaf vegetables, are good sources of β-carotene, in comparison to introduced European vegetables such as cabbage and lettuce. Levels of β-carotene retention in the selected leaf species under processing, drying and storage conditions selected for reproducibility at the rural level,

indicate a potential for use of dried leaf products as dry season vitamin A supplements to the diet. AA

2859 MALIWAL (BP). Studies on storage stability of leaf protein concentrate (LPC).
Nutr. Rep. Int. 23(3); 1981; 419-26
Accelerated storage stability studies at 110 C for 10 hour were carried out to determine the role of polyphenols present in LPC in stabilising LPC lipids against oxidation. The storage at 110 C resulted in decreased lipid extractability and iodine value of extracted lipids, loss of amino acids - methionine, lysine, tryptophan and histidine and lowered pepsin - pancreatin digestibility. Removal of polyphenols from LPC accelerated the lipid oxidation as indicated by extensive changes in all of the above mentioned parameters. The results indicate that storage of LPC can cause lipid oxidation resulting in decreased lipid extractability and loss of nutritive value. It also shows that polyphenols present in LPC act as potent antioxidants. AA

ALFALFA

2860 MALINOW (MR), McNULTY (WP), McLAUGHLIN (P), STAFFORD (C), BURNS (AK), LIVINGSTON (AL) and KOHLER (GO). The toxicity of alfalfa saponins in rats.
Food Cosmet. Toxicol. 19(4); 1981; 443-5
Saponins were isolated from aerial alfalfa plants (alfalfa top saponins: ATS) and fed to rats. During the first 4 days, ATS produced a depression intake; so 1% cholesterol was added to all the diets. From the 5th day onwards the animals behaved normally. Thus, ATS are not toxic to animals that have been fed cholesterol. Furthermore, ATS lower plasma cholesterol, decrease intestinal absorption of cholesterol, increase faecal excretion of neutral steroids and bile, and prevent antherosclerosis. Hence, these saponins may be useful for treatment of hypercholesteraemic patients. KMD

LUCERNE

2861 LUCAS. Economics of energy in the dehydration of pulps and lucernes by low temperature drying (pre-dryer and process patented).
Ind. Aliment. Agric. 97(7-8); 1980; 739-42 (French)

CHILLIES

2862 ROZIN (P), MARK (M) and SCHILLER (D). The role of desensitization to capsaicin in chili pepper ingestion and preference.
Chem. Senses. 6(1); 1981; 23-31
It has been suggested that part of the widespread preference for chili pepper can be explained as a desensitization of the chemical irritant receptors in the mouth, produced by continued exposure to chili pepper. To evaluate this possibility, we measure detection thresholds and salivary response of subjects who vary in liking for chili pepper and amount of exposure to it. The stimuli used are aqueous solutions of capsaicin, the purified piquant agent in chili peppers. We find very small but reliable and significant decreases in sensitivity to capsaicin for both measures by chili likers or users. We conclude that there is a slight desensitization effect, but also that it cannot be a major factor

in explaining the acquisition of chili preference. There is too much overlap between groups, and chili likers claim to like chili because of its chemical irritant ("mouth burn") effect, not in spite of it. AA

CORCHORUS

2863 FAWUSI (MOA) and FAFUNSO (M). Effects of the source and level of nitrogen on the yield and nutritive value of *corchorus olitorius*.
J. Plant Food. 3(4); 1981; 225-30
(1) The effects of two sources and three levels of nitrogen on yield and nutritive value of *Corchorus olitorius* (Tiliaceae) were investigated in the green house. (2) *C. olitorius* showed greater response to N applied in NO_3-form than that applied in NH_4 form in terms of yield and quality. (3) Higher Ca and Mg content were obtained with NO_3-N than NH_4-N. (4) Higher P and K content were obtained with NH_4-N. (5) Increasing N application also increased ascorbic acid content. AA

FRUITS

2864 ANON. Federal Republic of Germany: Market for semi-processed fruit and berries.
Profodcil Bull. 16(3); 1981; 17-52
This report highlights information on export opportunities for various, semi-processed products, market requirements, regulations affecting imports, marketing channels, prices and extent of competition. MVG

2865 PELAEZ (C) and KAREL (M). Improved method for preparation of fruit-simulating alginate gels.
J. Food Process. Preserv. 5(2); 1981; 63-81

2866 LIEBERS (H) and LINKE (L). Investigations on the re-use of twist off jars.
Lebensmittelindustrie. 27(9); 1980; 412-6 (German)
At first the results of investigations on the changes in twist-off closure caps when re-used are dealt with, on the basis of the quality requirements for fruit and vegetable preserves and of some fundamentals of heat preservation. Then the determination of low pressure in twist off glass jars is expalined. Since, at present, no filling and sealing machines are available for these glass jars in the fruit and vegetable processing industry in GDR, they can be re-used for preservation in households. Under this aspect, suitable preservation methods were checked, the preserved products were analysed, and the benefit calculated. KMD

2867 BOS (TJ) and ROMANI (RJ). Characterization and improvement of an assay for thiamine pyrophosphate with applications to fruit tissue at different stages of the climacteric.
J. Food Biochem. 5(4); 1981; 245-61
A method for the measurement of thiamine pyrophosphate was re-examined with regard to optima for pH, temperature, incubation time, and pyruvate decarboxylase apo-enzyme concentration. The purified apo-enzyme was shown to be stable for 30 days at -80 C. Optimized conditions resulted in assays about 10 times faster than previously described. Increases in TPP content were noted during

ripening ofavocado and pear fruit; however, the significance of the increases was circumscribed by limitations inherent to the extraction and assay procedures. Regulatory functions of TPP and their potential role in fruit tissues are discussed. AA

GOOSEBERRY

2868 RATHORE (DS). Physico-chemical evaluation of the fruits of four cultivars of Chinese gooseberry (*Actinidia chinensis*).
Indian J. Hortic. 38(1&2); 1981; 62-5
Growth studies were conducted on four varieties of Chinese gooseberry, (Abbott, Allison, Bruno, Hayward). Allison was the early cultivar, Abbott and Bruno midseason and Hayward the late cultivar. Hayward fruits were biggest in size. The highest ascorbic acid content and titratable acidity were found in Bruno, and least in Allison. Because of its high sugar content and earliness, Allison is recommended as the most suitable variety, for cultivation in the Simla (India) hills. KMD

GRAPE

2869 BINDRA (AS). Berry toughness and pedicel attachment in some cultivars of grapes.
Indian J. Hortic. 38(1/2); 1981; 4-8
Cheap, handy, and easy-to-work instruments, which give reproducible results, have been designed for measuring berry toughness and pedicel attachment. These instruments would help in the selection of suitable grape varieties for cultivation in North West India. Results of tests show that the Angoor Kalan variety may be a good parent for breeding new varieties which can withstand shipping and storage. The instruments can also be used to work out uniformity of ripening of various bunches. The experiments were done on the varieties Perlette, Himrod, Thompson Seedless, Anab-e-Shahi, Early Muscat, Beauty Seedless, and Angoor Kalan. KMD

BANANA

2870 CHAKRABARTI (N) and NANDI (B). Control of banana rot caused by *Botryodiplodia theobromae* in storage.
Indian J. Hortic. 38(1/2); 1981; 132-5
Banana rot caused by *Botryodiplodia theobromae* was almost completely controlled at concentrations of 1000 and 2000 ppm of aureofungin, and of 2000 ppm of brassicol, when used as a post-inoculation treatment. Captan and Agrosan GN controlled the rot to a limited extent. Citral and propionic acid were effective only to a limited extent, even at the highest level of 200 µl. KMD

CITRUS

2871 GUARDIOLA (JL), AGUSTI (M), BARBERA (J) and MARI (FG). The influence of gibberellic acid sprays during bud sprouting on vegetative growth in citrus trees.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 139-43
GA_3 sprays during bud sprouting stimulate vegetative growth both by a direct effect on leaf growth and through a reduction in the internal competition, because of a selective inhibition on bud

sprouting. These sprays are a powerful tool for the recovery of low vigour citrus orchards. AA

ORANGE

2872 LEQUERICA (JL), VILA (R) and FERIA (A). Citrus by-products utilization. III. Fermentation of orange peels by *Aspergillus niger*.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 95-102 (Spanish)

The growth of *Aspergillus niger* at different temperatures on ground orange peels as substrate have been studied. The experiments were carried out on trays, without heat pretreatment, and only mineral nutrients were added. It was found that 36.8% was the maximum transformation rate from mineral nitrogen to organic nitrogen, at 315 per day, as total amount of available heat units per day about 0 C. 576 g of dry matter with 20% of protein content were obtained from one kg of dry matter with 6.6% of protein. AA

MANGO

2873 KALRA (SK), HARMAIL SINGH and CHADHA (KL). Evaluation of some mango cultivars on the basis of their biochemical composition.
Indian J. Hortic. 38(1/2); 1981; 70-73

In the programme of work undertaken for the world mango germ plasm collection at Lucknow, India, the pulp of sixteen common Indian mango cultivars has been analysed for total soluble solids (TSS), reducing sugars, acidity, β-carotene, vitamin C, tannin, and protein. The local Lucknow varieties were found to be high in tannins. But tannins were significantly correlated to TSS, β-carotene, and vitamin C. Proteins and reducing sugars had a reciprocal correlation. From the standpoint of nutritive value, many varieties excelled the local, Lucknow mangoes. KMD

2874 El SAADANY (RMA), FODA (YH) and ELSAADANY (FM). Studies on starch extracted from mango seeds (*Mangifera indica*) as a new source of starch.
Starch. 32(4); 1980; 113-6

The aim of this research was to find a new source of starch that can be used mainly in the industrial field easily and economically. The yield of mango seeds was about 21% of starch. Amylase treatments proved that the extracted product from mango seed was starch. Chemical and physical characteristics of starch were determined, and microscopic studies were carried out to study starch molecules and granules. Results indicated that the pure starch was similar in its characteristics to tapioca starch. Viscosity of the pure mango seed starch was little lower while its solubility was a little higher than that of other starches. AA

2875 VAN PEE (WM), BONI (LE), FOMA (MN) and HENDRIKX (A). Fatty acid composition and characteristics of the kernel fat of different mango (*Mangifera indica*) varieties.
J. Sci. Food Agric. 32(5); 1981; 485-8

The kernels of 13 different mango varieties were examined. The kernels contained, depending on variety, from 6.8 to 12.6% fat, 5.2 to 6.3% protein (N x 6.25) and 1.4 to 2.0% ash on a moisture-free basis. The fat was yellow-coloured and melted at 32.5-35.8 C. Stearic and oleic acids constitute about 85% of the total fatty acids. The ratio of stearic:oleic acids varied according to variety from 0.56 to 0.97. The remaining fatty acids are, in decreasing order, palmitic, linoleic, arachidic and linolenic acids.

Oleic and linoleic acids represented about 88 and 10%, respectively, of the fatty acids incorporated at the *sn*-2-position of the triglycerides. AA

PEACH

2876 SANDHU (SS) and DHILLON (BS). Pattern of fruit growth, total titratable acidity and ascorbic acid in developing fruit of early and late peaches.
Indian J. Hortic. 38(1/2); 1981; 23-8
Fruits of flordasum and Sharbati peaches followed a double sigmoid growth pattern which was more pronounced in the latter. The peak of total titratable acidity in flordasum was attained at the end of stage II, while in Sharbati it occured at the start of stage III. The cultivars did not differ much in their ascorbic acid content. KMD

2877 LOPEZ-ROCA (JM), NAVARRO (G), BARBA (A) and NAVARRO (S). Relationships between the chemical and physical parameters in the maturation of the Jeronimo peach.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 131-8 (Spanish)
Several free sugars (xylose, fructose, galactose, glucose, sucrose, trehalose, and celobiose) as well as the polyols, sorbitol and myo-inositol, were estimated by gas chromatography during the ripening of Jeronimo peaches. The main compounds found to be present were sucrose, fructose, glucose, sorbitol, and myo-inositol. The sucrose/glucose ratio may be useful in fixing the optimum stage of maturation. Some organic acids were also estimated, mainly malic and citric acids. The ratio of malic,citric acid may also be used as an index of maturation. Relationships between the equatorial diameter of the fruit and the contents of sucrose and citric acid may also be useful. KMD

APPLE

2878 JEZEK (E) and SMYRL (TG). Volatile changes accompanying dehydration of apples of Osmovac process.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 43-4

2879 TUNGER (L), GROH (W) and ROTHE (M). Studies on sensory characterization of apple varieties. Part II. Autumn ripening varieties. Part III. Late ripening varieties.
Nahrung. 24(8); 1980; 773-85; 787-96 (German)
For evaluating flavour quality factors of apples, a sensory testing procedure, formerly discussed was applied to 5 apple varieties ripening in autumn. The results indicate the possibility of a comparative quality evaluation and differentiation between varieties during the same ripening period. Within two harvesting periods 'cox orangen' took the first place as to flavour properties followed by 'Alkmens' and and 'carola', whereas 'Elektra' and 'Goldparmane' only showed a good to medium sensory quality, depending on the harvest year. By means of a sensory evaluation procedure, quality differentiation as to varietal characteristics and harvesting year is possible in the case of late ripening apple varieties covered in Part II. From three late ripening varieties with dominating sweet taste quality, ranking was found in the range of 'Goldspur','Gelber kostlicher' (Yellow Delicious) and 'Mutsu'. Flavour quality of 'Goldspur' is similar to that of 'Berlepsch, the latter one being characterized by a more unfavo-

urable sugar/acid-ratio and inferior structure. With 'Goldspur' and 'Mutsu' total quality was improved by higher temperatures in the second harvesting year. AA

LOQUAT

2880 LAL (B), LAL (H) and PRASAD (A). Physico-chemical changes during growth and ripening of loquat fruits.
Indian J. Hortic. 38(1/2); 1981; 41-4
The increases of fruit size, pulp seed ratio, total soluble solids, ascorbic acid content, and sugars were followed during the growth and development of loquat fruits (Cv. Golden Yellow and Pale Yellow). It is concluded that both the cultivars should be harvested 90-95 days after fruit set. Standards for determining the harvest maturity have been fixed as 14% TSS, 1.02% acidity, 4.22 mg ascorbic acid/100 g pulp, and 10.64% total sugar for Golden Yellow; for Pale Yellow the corresponding values are 12.3, 1.04 and 4.60 and 9.8%. KMD

SUGAR, STARCH AND CONFECTIONERY

2881 PERROUD (G). The European sugar economy. Balance and perspective.
Ind. Aliment. Agric. 97(7-8); 1980; 729-36 (French)

2882 De CREMOUX (J) and LOMBARD (P). Sugar complex of Berotrou Koro: An example of energy economy in a sugar-cane factory.
Ind. Aliment. Agric. 97(7-8); 1980; 747-9 (French)

2883 DEVOS (P). Sugar-factory-cum-distillery and new sources of energy.
Ind. Aliment. Agric. 97(7-8); 1980; 751-4 (French)
After reviewing the earlier French initiatives for the production of fuel alcohol, the author indicates the direction a sugar-factory-cum-distillery must take, in order to become a producer of new sources of energy, and reduce its need for original petroleum products. He then considers, in turn, (a) the production of methane, (b) the production of fuel alcohol, and (c) the synthesis of methanol. These products can satisfy 8-12% of the present French demand for automotive fuel. KMD

2884 DUTHOIT (E) and DETAVERNIER (A). Applications of a new antispetic in a sugar factory.
Ind. Aliment. Agric. 97(7-8); 1980; 667-75 (French)
The usual method of disinfection of diffusers in beet-sugar factories, by "shock treatments" with formation is not very efficient in diffusers with "cold points". On the other hand, recirculation of settled water leads to increased contamination of the beet. The use of a new antiseptic, and of a continuous method of disinfection have been described, and its effects on washing water, cossettes, and press water, and in diffusion and purification reported. The quality of chemical required to maintain proper sanitary conditions and greatly reduce losses by fermentation is less than 40 g per tonne of beet. KMD

2885 KURKOWSKA-MIELCZAREK (A). Relation between the quality of sugar and its foaming property.
Ind. Aliment. Agric. 97(7-8); 1980; 679-82 (French)

Sugar samples of following quality were examined: ash 40-225 ppm, colour 25-65 IU, polarographic purity/surfactant index/48-0. A relation was found between the sugar quality and the stability of foam on the sugar solution with constant addition of molasses. The foam durability increased linearly from 5 to 15 minutes with the rise in polarographic purity. AA

2886 PONANT (J). Method of determination of the Brix of a sugar solution by conductimetry.
Ind. Aliment. Agric. 97(7-8); 1980; 685-8 (French)
A mathematical relation between the Brix of a sugar solution and the ratio of this solution at its maximum conductivity has been derived. This relation is expressed as follows: Log X - CX^{08} - log β = 0. This equation was solved by the Newton's method by means of a programmable calculator. This mathematical theory has been confirmed fully by an experimental study. AA

2887 LEBERT (A), ROUSSET (F), DUQUENOY (A) and BONNENFANT (P). Simulation of a controller for multiple effect evaporators in a sugar factory.
Ind. Aliment. Agric. 97(7-8); 1980; 691-8 (French)
The authors looked for an algorithm describing the development of main parameters characteristic of multiple effect evaporator. The laws they used are derived from thermodynamic fluid mechanical and characteristic equations for P.I.O. controllers. With this program, one can study different automatic evaporators. AA

2888 CELLE (R) and HERVE (D). Decolouration of a redissolved syrup of cane sugar in the Marseilles refinery.
Ind. Aliment. Agric. 97(7-8); 1980; 701-18 (French)
The authors present the condition of the Marseille refinery before modernisation. They give the results of the economic study which allowed the decolouration of cane syrup on resins. The description of the manufacturing process and results obtained are outlined. AA

2889 PARFAIT (A) and JOURET (C). Glycerol in the alcoholic fermentation of molasses and sugar-cane juice.
Ind. Aliment. Agric. 97(7-8); 1980; 721-4 (French)
The authors have pin-pointed the influence of various factors (mode of conduit, pH, level of inoculation, sugar content, and type of yeast) on the quantity of glycerol found in rums. They have also shown that glycerol can serve as a carbon substrate for diverse bacteria and then indicate the derivatives that can have a negative influence on the organoleptic properties of this spirituous beverage. KMD

2890 PANNE KEET (W). New development in the ion-exchanger regeneration systems in a sugar factory.
Ind. Aliment. Agric. 97(7-8); 1980; 757-60 (French)
Akzo Chemie has developed a method of removing Ca from resins by using sugar cane juice containing dissolved Na. The calcium is removed in the form of saccharates, and is sent for carbonation with excess NaOH. During carbonation, the saccharates are decomposed into calcium carbonate and saccharose. Thus, the regeneration effluent is totally recycled, and the waste-water does not carry a heavy load of Ca. The method is being patented. KMD

2891 UEDA (S) and MARSHALL (JJ). Raw starch digestion by *Bacillus polymyxa* β-amylase
Starch. 32(4); 1980; 122-5

Unlike plant β-amylases, *Bacillus polymyxa* β-amylase, digests raw starch at a significant rate. The action of this bacterial β-amylase on raw starch is stimulated greatly by the presence of the debranching enzyme, pullulanase. AA

2892 LARSSON (K). Inhibition of starch gelatinization by amylose-lipid complex formation.
Starch. 32(4); 1980; 125-6

Thermal gelatinization was carried out using potato starch as a 2% (w/w) aqueous suspension. 1-Monolaurin to a concentration of 1% (w/w) was added to one sample and another sample of the starch suspension without added lipid was used as control. Both samples were heated to 64 C under shaking at a speed of 10 C/hour. Temperature was kept constant for one hour at 64 C. The sample containing lipids showed no change, whereas the control appeared completely gelatinized. Temperature was increased to 68 C and kept there for one hour and no changes were observed. After cooling to 20 C, the samples were examined under the polarizing microscope. The sample containing lipid showed birefringent granules and there were not even signs of partial gelatinization. Physical state of the lipids, lipid monomer concentration and velocity of thermal gelatinization should be taken into account when interactions between starch and lipids are discussed. VR

2893 WOOTTON (M) and BAMUNUARACHCHI (A). Application of differential scanning calorimetry to starch gelatinization. III. Effect of sucrose and sodium chloride.
Starch. 32(4); 1980; 126-9

2894 WING (RE) and RAYFORD (WE). Oxidation of insoluble starch xanthate: Stabilization and metal ion removal.
Starch. 32(4); 1980; 129-32

2895 SILVER (M) and KAREL (M). The behaviour of invertase in model systems at low moisture contents.
J. Food Biochem. 5(4); 1981; 283-311

2896 SATO (HH) and PARK (YK). Purification and characterization of extraceullar isoamylase from *Flavobacterium* sp.
Starch. 32(4); 1980; 132-6

An extracellular isoamylase from *Flavobacterium sp.* was purified by fractionation with ammonium sulphate, DEAE-cellulose, DEAE-sephadex A-50 and CM-cellulose column chromatography. Single band of the debranching activity of the purified enzyme was detected by polyacrylamide gel electrophoresis. The enzyme efficiently hydrolyzed α-1,6-glucosidic linkage of glycogen and amylopectin and formed amylose chains, but did not hydrolyze pullulan. The enzyme released maltotriose from β-limit dextrin of waxy maize amylopectin and glycogen, but not of detectable maltose and glucose. Action of the isoamylase is similar to other microbial isoamylases, but its physical properties are different. AA

2897 LEE (VA). The nutritional significance of sucrose consumption. 1970-1980.
CRC Crit. Rev: Food Sci. Nutr. 14(1); 1981; 1-47

Discusses: production and consumption; availability of sucrose in the diet; sucrose content of foods; sucrose as a vehicle for fortification; taste sensitivity to sucrose; sucrose and disease; sugar consumption-recommendations; and energy cost of sugar. BSN

2898 LUDEWIG (H-G), BRETSCHNEIDER (F) and SOMMER (R). Effect of different sugar types in the production of confectionery goods.
Getriede-Mehl Brot. 34(8); 1980; 206-15 (German)
Sugar plays a significant role in baking technology in the production of confectionery goods. In these investigations, some aspects of the exchange of saccharose by other types of sugar in some baked goods (yeast raised proudcts, soft cake, brown ginger bread, tart and sand cakes) were examined. Overall 20-40% substitution of sucrose, led to a more lively brown colouration; while a more desirable decrease of the sweet impression could be achieved only by substitution with lactose. Variations in baking technology, without any change in the recipe, could produce only insignificant changes in the fresh-keeping quality. The soft juicy crumbs, desired today, with longer fresh keeping could be obtained only by changing the quantity used in a "normal" recipe to those used in sugar-and liquid-rich recipes. KMD

GUAR GUM

2899 BALASCIO (JR), PALMER (JK) and SALYERS (AA). Degradation of guar gum by enzymes produced by a bacterium from the human colon.
J. Food Biochem. 5(4); 1981; 271-82

BAKERY PRODUCTS

2900 LABUZA (TP) and KATZ (EE). Structure evaluation of four dry crisp snack foods by scanning electron microscopy.
J. Food Process. Preserv. 5(2); 1981; 119-27

BREAD

2901 DUBOIS (DK). Fermented doughs.
Cereal Food World. 26(11); 1981; 617-9, 621-2
This review focuses on the processing methods, ingredient selection and quality control for production of white pan bread. These principles can be applied to other yeast raised bakery foods, whether they be rolls, variety breads, doughnuts or sweet goods. KAR

2902 BLOKSMA (AH). Effect of surface tension in the gas-dough interface on the rheological behaviour of dough.
Cereal Chem. 58(6); 1981; 481-6

2903 KILBORN (RH), NOMURA (S) and PRESTON (KR). Sponge-and-dough bread. I. Reduction of fermentation time and bromate requirement by the incorporation of salt in the sponge.
Cereal Chem. 58(6); 1981; 508-12
The study has revealed that addition of 1% sponge salt in commercial sponge-and-dough procedures, provides a method of reducing sponge time and/or oxidation needs without any basic changes in the processing conditions. BSN

2904 El-SAMAHY (SK) and TSEN (CC). Effects of varying baking temperature and time on the quality and nutritive value of balady bread.
Cereal Chem. 58(6); 1981; 546-8
Baking balady breads at temperatures from 288 to 343 C for 4 minutes, reduced the loaf weight and significantly darkened the

top and bottom crusts. Slight differences in chemical characteristics and amino acid contents were observed between balady breads baked at high temperatures (248-343 C) and short periods (3.5-7.0 minutes). Bread protein quality deteriorated significantly due to increased baking temperature or prolonged baking time as evidenced by increase in feed conversion ratio and reduction of PER in rat feeding studies. BSN

2905 BARBER(S) and BENEDITO de BARBER (C). Criteria for the quality control of bread that is popularly consumed.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 63-9 (Spanish)

2906 MEUSER (F). Resorption and digestibility of whole-meal-breads with special regard to dietary fibre.
Getriede-Mehl Brot. 34(8); 1980; 217-22 (German)
Whole meal products contribute to healthy nutrition. Increase in the consumption of whole meal bread would have a positive effect on the uptake of higher polymer carbohydrates, dietary fibres, minerals and vitamins. The indigestible and insoluble high polymer carbohydrates, which are the main components of the dietary fibres, exert a positive, physiological effect on the process of digestion. Protein in whole meal breads has a greater relative nutritive value than that in bread from white flour. This is partly due to the small crusts of these breads. During baking, these are formed as reaction products of proteins and carbohydrates, which are not accessible to digestion. As the quantity of lysine in such breads is limited, whole meal breads with small crusts have higher nutritive value. KMD

2907 AZZOLA (FK) and SCHNABEL (B). Stone cross near MecKesheim, especially the bakers' symbols "shovel" or "ladle", and "loaf".
Getriede-Mehl Brot. 34(8); 1980; 222-4 (German)

CAKE

2908 PATON (D), LAROOQUE (GM) and HOLME (J). Development of cake structure: Influence of ingredients on the measurement of cohesive force during baking.
Cereal Chem. 58(6); 1981; 527-9
The magnitude of maximum cohesive force developed in a high-ratio cake formulation was influenced by the level of the most important batter ingredients and probably results from the opposing action, of those of the ingredients that toughen and those that tenderize. BSN

MILK AND DAIRY PRODUCTS

2909 WHITE (GW) and SHENTON (AJ). Food microscopy (An annotated Bibliography). Part III. D. Dairy products.
J. Assoc. Public Anal. 19(Pt.3); 1981; 105-10

MILK

2910 CLARKE (HC). Milk, cellular equilibrium and nutritional evolution.
Int. J. Vitamin Nutr. Res. 51(3); 1981; 293-6

2911 KOSARIC (N), KITCHEN (B), PANCHAL (CJ), SHEPPARD (JD), KENNEDY (K) and SARGANT (A). UHT milk : Production, quality and economics.
CRC Crit. Rev. Food Sci. Nutr. 14(2); 1981; 153-99
Discusses: ultra high temperature processing of milk; energy requirements and economics in direct and indirect processing systems; comparison with HTST process; marketing; material; and heat balances for fluid milk processing, storage, and distribution systems; aseptic packaging and quality factors. BSN

2912 FREEMAN (NW) and MANGINO (ME). Effects of ultra-high temperature processing on size and appearance of casein micelles in bovine milk.
J. Dairy Sci. 64(9); 1981; 1772-80

2913 GORNER(F) and UHEROVA (R). The retentions of some vitamins during the ultra-high temperature sterilization of milk.
Nahrung. 24(8); 1980; 713-8 (German)
Four independent studies were conducted in the course of two years to determine the retentions (or the losses) of vitamin A, β-carotene, vitamin B_1, vitamin B_2, vitamin B_6, nicotinic acid and panthotenic acid during the ultra-high temperature sterilization of pre-pasteurized milk (85 C without hold up time) by means of the Alfa-Laval-Vtis-C apparatus (140 C, 3-4s, direct heating with subsequent expansion). The following retentions (or losses) were obtained vitamin A, 97.2% (2.8%); β-carotene 93.9% (6.1%); vitamin B_1 82.2% (12.0%); vitamin B_2 97.6% (2.4%); Vitamin B_6 92.7% (7.3%); nicotinic acid 96.0% (4.0%); and panthotenic acid 96.4% (3.6%). AA

2914 RICHMOND (ML), GRAY (JI) and STINE (CM). Beta-galactosidase: Review of recent research related to technological application, nutritional concerns, and immobilization.
J. Dairy Sci. 64(9); 1981; 1759-71
The carbohydrate β-galactosidase is reviewed. A brief discussion of enzyme sources, isolation, purification and assay techniques is presented: potential commercial applications of lactose hydrolyzed products are described. Various immobilized lactase systems are described in chronological order, and recent applications are discussed. Because of the increased interest in this research, some nutritional concerns are also discussed. AA

2915 JUVEN (BJ), GORDIN (S), ROSENTHAL (I) and LAUFER (A). Changes in refrigerated milk caused by enterobacteriaceae.
J. Dairy Sci. 64(9); 1981; 1781-4
Laboratory-pasteurized samples of whole raw milk were inoculated with psychrotrophic strains of *Citrobacter freundii*, *Enterobacter agglomerans*, *Enterobacter cloacae*, *Escherichia coli*, *Klebsiella ozaenae*, and *Serratia liquefaciens* and incubated for 7 days at 7 C. All test organisms caused a pH reduction that ranged from 0.12 (*C. freundii*) to 0.69 units (*K. ozaenae*), but none reduced pH to lower than 6.0. Following growth of *E. agglomerans*, *K. ozaenae*, *S. liquefaciens*, and *E. cloacae*, the milk coagulated upon heating or upon addition of alcohol; with *C. freundii* and *E. coli* the milk did not coagulate. All organisms caused reductions in the redox potential (Eh) of milk, ranging from 20 mV (*E. coli*) to 152 mV (*S. liquefaciens*). All organisms caused an increase in free tyrosine plus tryptophane in milk ranging from 3.5 (*E. agglomerans*) to 12.5 µg/ml (*E. cloacae*) as well as an increase in free fatty acids in milk which ranged from 0.29 (*C. freundii*) to 0.89 µeq/ml (*K. ozaenae*). In spite of the significant proteolytic and lipolytic acti-

vities exhibited in milk by some of the organisms, none showed proteolytic activity in skim milk-nutrient agar or lipolytic activity on Tween 80 agar. AA

2916 MARTIN (DR) and GILLILAND (SE). Inhibition of psychrotrophic bacteria in refrigerated milk by lactobacilli isolated from yoghurt.
J. Food Prot. 43(9); 1980; 675-8, 682

2917 LaCROIX (OE) and WONG (NP). Determination of iodine in milk using the iodide specific ion electrode and its application to market milk samples.
J. Food Prot. 43(9); 1980; 672-4

2918 GEBRE-EGZIABHER (A), HUMBERT (ES) and BLANKENAGEL (G). Hydrolysis of milk proteins by microbial enzymes.
J. Food Prot. 43(9); 1980; 709-12

2919 DOUGLAS (FW) Jr., RAINEY (NH), WONG (NP), EDMONDSON (LF) and LaCROIX (DE). Colour, flavour and iron bioavailability in iron-fortified chocolate milk.
J. Dairy Sci. 64(9); 1981; 1789-93

2920 BELL (RR) and SPICKETT (JT). The influence of milk in the diet on the toxicity of orally ingested lead in rats.
Food Cosmet. Toxicol. 19(4); 1981; 429-36
Milk consumption increases tissue-lead concentrations in rats fed low concentrations of lead and milk simultaneously. Lactose appears to be the factor in milk responsible for this increase. Further, research is needed on the interactions of diet and lead toxicity; more sensitive methods are also needed for assessing the health effects of chronic exposure to low levels of lead. KMD

2921 DEDEK (W), SCHEYBAL (A), GABRIO (T) and KIRST (E). Breakdown and extraction of ^{32}P-naled in milk.
Nahrung. 24(8); 1980; 767-72 (German)
The organophosphorus insecticide naled (O, O-dimethyl-O,O-(1,2-dibromo-2,2-dichloroethyl)-phosphate, labeled by ^{32}P) is degraded in milk *in vitro* at 5 C with a half-life of 35 hours with dichlorvos as a metabolite, that is also formed at short time heating and UV-irradiation. The recovery in milk powder is 25% (naled + dichlorvos) of the initial concentration. Following spray application of 0.05 mg naled/kg body mass to 2 lactating cows, 5-8 ppb of naled and 7-9 ppb of dichlorvos were found in the milk. AA

2922 MILLER (GJ), APPLEGATE (SL), RADLOFF (HD) and NELMS (GE). Rapid extraction of milk fat.
J. Dairy Sci. 64(9); 1981; 1861-2
A rapid procedure for extraction and purification of fat from 1.0 ml milk is described. It involves freeze-drying, extraction with a chloroform-methanol solvent, and eventual microfiltration through a teflon microfilter. Results expressed as grams of fat/100 ml milk from 437 samples agreed with milk fat content as measured by the Babcock procedure with an accuracy of 99.0%. AA

2923 SCHUT (J). Milk proteins in food products.
Ind. Aliment. 19(177); 1980; 847-56 (Italian)

2924 WOOLLARD (DC) and WOOLLARD (GA). Determination of vitamin A in fortified milk powders using high performance liquid chromatography.
NZ. J. Dairy Sci.Technol. 16(2); 1981; 99-112

A fast and reliable method has been developed to extract vitamin A from milk powder without the use of saponification. The milk powder is first dispersed in a non-aqueous solvent mixture to release the natural and added vitamin A esters. The lipid fraction is then partitioned into hexane, a portion of which is injected directly into a high performance liquid chromatograph without further concentration or purification. The chromatograph conditions comprise a normal phase silica column with an isocratic hexane: chloroform mobile phase. This system can adequately tolerate the injection of large quantities of lipid material and simultaneously permit separation of vitamin A from the fat. AA

2925 KENNEDY (BW), FINLEY (CM), POLLAK (EJ) and BRADFORD (GE). Joint effects of parity, age, and season of kidding on milk and fat yields in dairy goats.
J. Dairy Sci. 64(8); 1981; 1707-12

2926 BLOORE (CG) and BOAG (IF). Some factors affecting the viscosity of concentrated skim milk.
NZ. J. Dairy Sci. Technol. 16(2); 1981; 143-54

The viscosity of concentrated skim milk produced in a pilot-scale three effect falling film evaporator was investigated with an in-line viscometer over two dairying seasons. A regression equation was obtained relating the viscosity of the concentrate to the total solids and temperature of the concentrate and the protein content of the milk solids. The logarithm of the viscosity increased linearly with increasing total solids and protein content. As the concentrate temperature was increased, the viscosity decreased to a minimum and then increased. The effects of preheat conditions and concentrate total solids, temperature and holding time were also investigated. A high temperature, short time preheat treatment gave a lower initial concentrate viscosity and a slower rate of viscosity increase with holding time than a low temperature, long time treatment giving a similar degree of denaturation as measured by the Whey Protein Nitrogen Index. AA

2927 RUTZINSKI (JL) and MARTH (EH). Behaviour of *Enterobacter* species and *Hafnia* species in skim milk during fermentation by lactic acid bacteria.
J. Food Prot. 43(9); 1980; 720-8

GHEE

2928 LAMBELET (P), SINGHAL (OP) and GANGULI (NC). Detection of goat body fat in ghee by differential thermal analysis.
J. Am. Oil Chem. Soc. 57(10); 1980; 364-6

The differences in the melting diagrams and crystallization patterns of goat body fat and ghee, as determined by differential thermal analysis, provide a basis for the determination of adulteration in cow or buffalo ghee. The new endothermic peak on the melting diagram in samples having more than 10% goat body fat can be used for qualitative detection and the crystallization diagram can be used for quantitative estimation. AA

WHEY

2929 RENNER (R) and JELEN (P). Nutritional evaluation of alkali solubilized heated whey protein.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 10-13

CHEESE

2930 El-GENDY (SM), ABDEL-MOTALEB (L) and ABO-ELNAGA (I). Characteristics of domiatti cheese made from milk containing formlain
J. Food Prot. 43(9); 1980; 694-8, 705

2931 HARVEY (CD), JENNESS (R) and MORRIS (HA). Gas chromatographic quantitation of sugars and nonvolatile water-soluble organic acids in commercial cheddar cheese
J. Dairy Sci. 64(8); 1981; 1648-54
The GLC method was developed and applied for quantiating sugars as trimethylsilyl derivatives and nonvolatile water-soluble organic acids as methyl esters in cheddar cheese extracts. Twelve samples of commercial cheese aged from 5-164 days contained 72.0-479 mg lactose, 2-147 mg galactose, 4-11 mg glucose, 1.0-1.6 g lactic acid and 0-19 mg succinic acid/100 g cheese. BSN

MEAT AND POULTRY

2932 WEAVER-SMITH (J). Making meat and only meat.
Food Flavour. Ingred. Packag. Process. 3(10); 1981; 33-5

2933 PRZYBILSKI. Experience with Hungarian protective apron for the meat industry.
Fleisch. 33(7); 1979; 130-31 (German)

2934 KING (NL), KURTH (L) and SHORTHOSE (WR). Proteolytic degradation of connectin, a high molecular weight myofibrillar protein during heating of meat.
Meat Sci. 5(5); 1981; 389-96

2935 STERN (NJ) and OBLINGER (JL). Recovery of *Yersinia enterocolitica* from surfaces of inoculated hearts and livers.
J. Food Prot. 43(9); 1980; 706-8, 712

2936 HAZELL (T), LEDWARD (DA), NEALE (RJ) and ROOT (IC). The role of non-haemproteins in meat haemoprotein digestion.
Meat Sci. 5(5); 1981; 397-405

2937 QUAGLIA (GB). Methods of smoking meat.
Ind. Aliment. 19(177); 1980; 833-5 (Italian)

2938 AHRENS. Evaluation of the quality of canned meat and sausages in 1978.
Fleisch. 33(7); 1979; 124 (German)

2939 PATANO (C) and CASERIO (G). Bacteriological and chemical researches on minced meat.
Ind. Aliment. 19(177); 1980; 829-32 (Italian)
The authors have proposed the following bacteriological limits for minced meat of adequate (though not of the best) quality: total aerobic mesophilic count 10-50 million/g; total coliforms 2000-5000/g; *E. coli* 200/g; *Streptococci fecali* 5000/g; coagulase + *Staphylococcus* 200/g; *Salmonellae* 25/g. Although the French standards are very much lower than these limits, the authors regard their own proposals as more realistic in the present conditions of minced meat production in Italy. KMD

2940 KUNZ (B), BLUMEL (W), SCHARNER (E) and HOFMANN (HP). Aspects of the choice of bacteria for their use as starter culture in the meat industry.
Fleisch. 33(7); 1979; 131-4 (German)
The development of bacteria as starter cultures is possible either by the isolation of bacteria from the foodstuff, in which they are supposed to be used as starter organisms, or by a choice of bacteria with known positive effect on foodstuff and subsequent adaptation in another reaction medium. Theoretical and practical problems of adaptation in roasted sausage have been discussed with examples of *Streptococcus lactis*, *Lactobacillus helveticus* and *Streptococcus thermophilus*. The knowledge obtained is significant for various branches of food industry. KMD

2941 STILES (ME) and NG (LK). Biochemical characteristics and identification of *Enterobacteriaceae* isolated from meats.
Appl. Environ. Microbiol. 41(3); 1981; 639-45
The isolation and identification of 2,220 *Enterobacteriaceae* from meats indicated that *Escherichia coli* biotype I, *Enterobacter agglomerans*, and *Serratia liquefaciens* were the principal types to be differentiated in meats. *Citrobacter freundii*, *Klebsiella pneumoniae*, *Enterobacter cloacae*, and *Enterobacter hafniae* were also commonly identified. Identification of isolates by the Encise II (Roche Diagnostics Inc., Nutley, N.J.) and Minitek (BBL Microbiology Systems, Cockeysville, Md.) coding systems gave similar results with only 255 (11.5%) discrepancies in identity, but both systems required large numbers of supplementary tests for identification of the isolates. Not only the distribution of *Enterobacteriaceae* types isolated from meats,but also some of the biochemical reactions of the isolates differed from those of clinical isolates. The Minitek technique is recommended because of its versatility. However, with the addition of cellobiose and salicin disks and the inclusion of methyl red to the Minitek test and the use of the Voges-Proskauer test and gas production of EC medium at elevated temperature as standard tests, the identification of these *Enterobacteriaceae* from meats would be greatly facilitated. The inclusion of the motility test, for example, using nitrate motility agar, would also be of value to *Enterobacteriaceae* identification. AA

2942 DURRANT (DS) and BEATSON (SH). Salmonellae isolated from domestic meat waste.
J. Hyg. 86(3); 1981; 259-64
During 1977 and 1978, 172 samples from 14 batches of domestic meat waste were examined for the presence of salmonellae. Each batch was derived from the domestic refuse collected from approximately 120 houses. Thirty-five strains of ten *Salmonella* serotypes were isolated from 32 samples from 8 batches. The probable origin of these serotypes and their significance when domestic waste is exposed to predation by birds and animals on refuse tips is discussed. AA

2943 UBERTALLE (A). Qualitative characteristics of meat.
Ind. Aliment. 19(177); 1980; 836-40 (Italian)
The author has discussed several parameters which are used in the quality control of pork and beef carcasses. On the basis of his own studies and experiments, he has analyzed the methods that can be employed to arrive at a judgement regarding the "original quality" of the meat obtained from the carcasses. KMD

2944 FLINT (FO) and FIRTH (BM). A toluidine blue stain mountant for the microscopy of comminuted meat products.
Analyst. 106(1268); 1981; 1242-3

2945 COMI (G) and CANTONI (C). Yeasts in dry sausages.
Ind. Aliment. 19(177); 1980; 857-60 (Italian)
Yeasts which are present in dry sausages have been identified as *Debaromyces* spp., *Rhodotorula* spp., *Hansenula* spp., and *Torulopsis* spp. The taxonomy of these yeasts has also been reported. The yeasts do not appear to influence the ripening of dry sausages. KMD

2946 PATEL (KM), MERKEL (RA), REYNOLDS (AE) and YOUNGS (CG). Texturized navybean protein concentrate as a meat extender in frankfurters.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 5-9

BEEF

2947 SWATLAND (HJ). Membrane survival in prerigor beef muscle.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 45-6

2948 WINGER (RJ) and POPE (CG). Osmotic properties of post-rigor beef muscle.
Meat Sci. 5(5); 1981; 355-69

2949 MOLLER (AJ), SORENSEN (SE) and LARSEN (M). Differentiation of myofibrillar and connective tissue strength in beef muscles by Warner-Bratzler shear parameters.
J. Texture Stud. 12(1); 1981; 71-83

2950 PERRYMAN (DL) and NASSIF (WS). The influence of processing techniques on the final quality of tripe.
J. Assoc. Public Anal. 19(Pt.3); 1981; 95-100

2951 CARBONELL (JV), VALLES (S) and PINAGA (F). Stability of pre-cooked dimers, as a function of the method of preservation. I. Tests with beef goulash.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 103-11 (Spanish)
Samples of frozen (-18 C) beef goulash retained their original quality for a storage period of 108 days. Canned (heat-sterilized) samples showed a slight decrease in acceptability as the storage period increased; but a statistical analysis showed no significant difference between frozen and canned samples. Freeze-dried samples were considered inferior to the other two during the early part of the storage period; after 78 days of storage at room temperature, they were no longer acceptable to the taste panel. Oxidative degradation processes are responsible for the loss of quality of the freeze-dried samples. KMD

2952 STANLEY (G), SHAW (KJ) and EGAN (AF). Volatile compounds associated with spoilage of vacuum-packaged sliced luncheon meat.
Appl. Environ. Microbiol. 41(3); 1981; 816-8
GC-MS analysis led to the identification of seven volatile compounds in vacuum packaged sliced corned beef spoiled by *Brochothrix thermosphacta* under aerobic conditions. The major components exerting sensory significance were acetoin and diacetyl. BSN

2953 BERRY (BW), WELLS (LH), CROSS (HR), EMSWILER (BS) and MUSE (HD). Shelf-life characteristics and aerobic plate counts of ground beef as influenced by fat level and fat source.
J. Food Prot. 43(9); 1980; 713-6

2954 MacLEOD (G).and SEYYEDAIN-ARDEBILI (M). Natural and simulated meat flavours (with particular reference to beef).
CRC Crit. Rev. Food Sci. Nutr. 14(4); 1981; 309-437
Discusses: natural meat flavour (with particular reference to beef); origin; nature of precursors, formation and pathways of volatile components contributing to meat flavours; aroma components of natural beef and their relative contribution to overall flavour; and simulated meat flavourings - beef flavours. BSN

2955 ROSS (PF), OSHEIM (DL) and NELSON (HA). PCB residues in feedlot steers.
Bull. Environ. Contam. Toxicol. 26(4); 1981; 485-8

SHEEP

2956 CHRYSTALL (BB), DEVINE (CE) and NEWTON (KG). Residual blood in lamb muscles.
Meat Sci. 5(5); 1981; 339-45

2957 KIRTON (AH), FRAZERHURST (LF), WOODS (EG) and CHRYSTALL (BB). Effect of electrical stunning method and cardiac arrest on bleeding efficiency, residual blood and blood splash in lambs.
Meat Sci. 5(5); 1981; 347-53

PORK

2958 STOTZER. Stunning tongs with sensor circuit for pigs.
Fleisch. 33(7); 1979; 130 (German)

2959 ROBINSON (PN) and TOMBS (MP). Myofibrils, sarcoplasmic reticulum and phosphorylase kinase of pietrain and large white-landrace pigs.
Meat Sci. 5(5); 1981; 323-38

2960 PUOLANNE (E) and RUUSUNEN (M). The properties of connective tissue membrane and pig skin as raw materials for cooked sausage.
Meat Sci. 5(5); 1981; 371-82

2961 KEMPSTER (AJ), CUTHBERTSON (A) and SMITH (RJ). A national survey of the weight loss in pig carcasses between slaughter and 24 hours post mortem.
Meat Sci. 5(5); 1981; 383-7

2962 CHIANG (BH), NORTON (HW) and ANDERSON (DB). The effect of hot-processing, seasoning and vacuum packaging on the storage stability of frozen pork patties.
J. Food Process. Preserv. 5(3); 1981; 161-8
The storage stability of frozen pork patties was studied using a 2 x 2 x 2 factorial design comparing hot boned (H) versus chilled meat (C), seasoned (S) versus nonseasoned (N), vacuum (V) versus oxygen permeable (P) packaging and their interactions. Results showed that the effect of hot-processing is dependent on the packaging method and the presence of seasoning . In general, vacuum packaging is required to optimize the advantages of hot-processing

in retarding lipid oxidation. The increased moisture cooking loss of hot processed product can be reduced significantly by the addition of seasoning. AA

2963 BUTLER (JL), VANDERZANT (C), CARPENTER (ZL), SMITH (GC), LEWIS (RE) and DUTSON (TR). Influence of certain processing steps on attachment of microorganisms to pork skin.
J. Food Prot. 43(9); 1980; 699-705

RABBIT

2964 MRIGADAT (B), SMITH (GC), DUTSON (TR), HALL (LC), HANNA (MO) and VANDERZANT (C). Bacteriology of electrically stimulated and unstimulated rabbit, pork, lamb and beef carcasses.
J. Food Prot. 43(9); 1980; 686-93,705

POULTRY

2965 FAIRBROTHER (JG) and GARDNER (JAA). Food odyssey - 2001. Poultry, pork and eggs.
Food Technol. Aust. 33(7); 1981; 322-4
Aspects covered include nutrition of animals, management, diseases and welfare of animals; and new products. This has relevance only to Australian conditions. KAR

2966 PAI (KN). Feeding poultry for production.
Poult. Guide. 18(11); 1981; 63-6

2967 MARQUES (MA). Common terms related with nutrition and feeds.
Poult. Guide. 18(11); 1981; 153-6

CHICKEN

2968 MORAES (MAC), SCHNEIDER (IS) and FORSTER (RJ). Effects of dietary soyabean lecithin on some sensory and rheological properties of frozen and non-frozen chicken meat.
J. Texture Stud. 12(1); 1981; 63-9
Soyabean lecithin was added to practical rations fed to 144 broiler chicks. The dark and white meats from frozen and non-frozen carcasses were submitted to both mechanical (Warner Bratzler and Instron Universal Testing Machine) and sensory assessments of tenderness. A good correlation was observed between the two types of measurements. Regression equations indicated that higher lecithin contents in the rations decreased sensory toughness of the white meat. Freezing of the meats at -40 C had little effect on texture. AA

2969 SHIOZAWA (K), KATO (E) and SHIMIZU (A). Enterotoxigenicity of *Staphylococcus aureus* strains isolated from chickens.
J. Food Prot. 43(9); 1980; 683-5,705

TURKEY

2970 ANGEL (S) and WEINBERG (ZG). Gelation property of salt soluble protein of turkey muscle as related to pH.
J. Food Technol. 16(5); 1981; 549-52

The gelation property of the salt soluble proteins of turkey breast and thigh plus drumstick were compared, and the proteins of the latter were found to have greater gelation capacity. The experiments were repeated on three separate occasions during which the pH level of the breast muscle was found to range from 5.8 to 5.95 while that of the leg meat ranged from 6.0 to 6.8. It is concluded that the different gelation capacities which are apparently related to the initial pH level in the breast and leg meats, could affect palatability and should be taken into account in the development of turkey products. AA

EGG

2971 MAHAPATRA (CM) and PANDEY (NK). Egg cholesterol *vis-a-vis* heart diseases.
Poult. Guide. 18(11); 1981; 115-7

2972 CAPPON (CJ) and SMITH (JC). Chemical form and distribution of mercury and selenium in eggs from chickens fed mercury - contaminated grain.
Bull. Environ. Contam. Toxicol. 26(4); 1981; 472-8

2973 BARUA (N) and RANGANATHAN (P). Egg shell strength. Its importance.
Poult. Guide. 18(11); 1981; 129-31

SEAFOODS

FISH

2974 ROTHSCHILD (BJ). More food from the sea.
Bioscience. 31(3); 1981; 216-22
Discusses: estimates of total production: economics of fish production; biological model (stage I & II dynamics); technology and cost shifts; and more food from the sea and public policy. BSN

2975 RYTHER (JH). Mariculture, ocean ranching, and other culture-based fisheries.
Bioscience. 31(3); 1981; 223-30

2976 CLARK (CW). Bioeconomics of the ocean.
Bioscience. 31(3); 1981; 232-7

2977 MOLLEDA (A). The traditional process for salting and drying of fish in Caleta San Jose, Peru.
Trop, Fish Process. Newsletter. No. 4; 1982; 2-4

2978 PURNOMO (H), SUMARDI (JA) and SUSANTO (WH). The traditional fish drying in East Java. A preliminary study.
Trop. Fish Process. Newsletter No. 2; 1982; 4-6

2979 D'AOUST (JY), GELINAS (R) and MAISHMENT (C). Presence of indicator organisms on recovery of *Salmonella* in fish and shellfish.
J. Food Prot. 43(9); 1980; 679-82

2980 SIKORSKI (ZE) and NACZK (M). Modification of technological properties of fish protein concentrates.
CRC Crit. Rev. Food Sci. Nutr. 14(3); 1981; 201-30
Discusses: Quality of concentrated fish protein concentrate (FPC); and modification of technological properties. BSN

SARDINE

2981 TSUKUDA (N). Oxidative stabilities in sardine lipids and the effect of antioxidants on frozen sardine.
J. Jpn. Soc. Food Sci. Technol. 27(8); 1980; 388-92
Oxidative stabilities in sardine lipids and the effect of various antioxidants on sardine lipids were examined by weighing method, peroxide value and thiobarbituric acid test. In the case of tissues the lipids of skin (including subcutaneous fat) showed the most rapid oxidation, followed by the lipids of belly flap and dark muscle, but the lipids of ordinary muscle were stable remarkably. In the case of lipid classes, phospholipids were the most labile, followed by free fatty acids and neutral lipids. Additions of 0.02% of BHA or 0.08~0.12% of tocopherol (mainly α and γ types) to the lipids of skin or belly flap were the most effective to protect the oxidation among the various antioxidants examined. For frozen sardine stored at -20 C, the lipid oxidation could be inhibited effectively by dipping for several minutes in the solutions of 0.1% sodium bisulphite, 1% sodium erysorbate, commercial tocopherol agent (0.05% as tocopherol) and 0.01% BHA + BHT (mixture of 1:1) or by glazing with these solutions. AA

MULLET

2982 WOOTTON (M) and CHUAH (SH). The use of sea mullet (*Mugil cephalus*) in the production of cold marinades.
Food Technol. Aust. 33(8); 1981; 392-4
Mullet fillets were used to produce cold marinades of the rollmops type by means of a two stage curing process at 2 C. The first stage involved a period of 8-12 weeks in brines containing 10-14% salt and 3-7% acetic acid. This was followed by 2 weeks in weaker brine containing 3% salt and 1.5% acetic acid. The products could be stored satisfactorily at 2 C for 10 weeks and compared favourably with three commercial products made from herring in terms of organoleptic acceptability, thiobarbituric acid number and total volatile bases. AA

MACKEREL

2983 REECE (P). Recovery of high quality oil from mackerel and sprat by the silage process.
J. Sci. Food Agric. 32(6); 1981; 531-8
Increases in the free fatty acid (FFA) content of oil from oily fish silage, recovered by centrifugation, have been shown to be principally associated with the release of FFA from solid material during liquefaction of the fish. Much of the initial FFA is present in the digestive tract of the fish prior to acidification. Pigmentation of the oil during ensiling is shown to be caused by the release of the acid hydrolysis product of haemoglobin, haemin. A 2% addition of 0.20 volume hydrogen peroxide has been shown to inhibit oil pigmentation and to reduce the FFA content in the recovered oil. Peroxide values of the oil, reduced by this treat-

ment, can be further reduced by the addition of an oil-soluble antioxidant to the silage. AA

ROCKFISH

2984 KRAMER (DE) and PETERS (MD). Effect of pH and prefreezing treatment on the texture of yellow tail rockfish (*Sebastes flavidus*) as measured by the Ottawa Texture Measuring System.
J. Food Technol. 16(5); 1981; 493-504

PROTEIN FOODS

2985 VEDA (S), ASAKUSA (S) and KUWABARA (Y). *Bacillus* in commercial baby foods.
J. Jpn. Soc. Food Sci. Technol. 27(8); 1980; 400-402 (Japanese)
Commercial baby food staples including 78 dried, 44 bottled and 10 canned products were evaluated bacteriologically. Most of bottled and canned staples contained less than 10^2/g of aerobic bacteria. But, dried staples were contaminated with the relatively higher number of bacteria: particularly, among 14 of 26 milk-containing foods, their bacterial counts were more than 10^2/g. *B. licheniformis* and *B. subtilis* were recovered at the highest frequency from any type of staples. In addition to these two species, *B. cereus*, *B. pumilus*, *B. megaterium*, *B. circulans* and *B. coagulans* were also isolated frequently from dried foods. AA

FRUIT JUICES AND BEVERAGES

2986 GARCIA (R) and BURON (I). Relationship between the structure and rheological behaviour of juices and purees of fruit and vegetables.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 70-78 (Spanish)
The juices and purees of fruits and vegetables can be considered as a solid-particle suspension (rest of vegetable structures) in a liquid. The liquid is constituted by a pectin colloidal solution in a true solution of sugars, acids and salts. The structure explains satisfactorily the rheological behaviour of these products and the influence of processing. AA

ORANGE JUICE

2987 LAFUENTE (B). New perspectives in the utilization of by-products of the citrus juice industry.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 13-21 (Spanish)
This is a review of the recovery of valuable material from the orange peels and pulp that form by-products of the orange juice industry. The substances covered are : aromatic components, essential oil with limonene, pigments, pectin from peels, juice from pulp, and use of peels as animal feed. KMD

2988 ALBEROLA (J) and IZQUIERDO (L). The volatile fraction of orange juice IV. Identified components.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 79-86
Compounds identified by several authors in the volatile fraction of orange juice are compiled. Components responsible for off-

flavours of orange juice due either to inadequate processing or to long-time storage are also listed. Some of these products have been suggested as indicators of orange juice quality. AA

2989 ROBERTSON (GL) and REEVES (MJ). Relationship between colour and brown pigment concentration in orange juices subjected to storage temperature abuse.
J. Food Technol. 16(5); 1981; 535-41
Orange juice stored for 40.5 hours at 55 C showed browning index which highly correlated with CIE tristimulus values as measured on a Neotec Du-color colour difference meter. On conversion of these values to USDA colour scores, the values were not found to be in the same range as the USDA plastic standards for orange juice. However, a significant correlation was found when the tristimulus values were converted to Hunter's citrus red and citrus yellow parameters, thus indicating a marked correlation between these parameters and the browning index. BSN

TEA

2990 ANON. Convenience teas face uncertain future.
Tea Coffee Trade. J. 153(9); 1981; 44

COFFEE

2991 VOILLEY (A), SAUVAGEOT (F), SIMATOS (D) and WOJCIK (G). Influence of some processing conditions on the quality of coffee brew.
J. Food Process. Preserv. 5(3); 1981; 135-43
The influence of some processing conditions on the organoleptic quality of coffee beverage (grinding, proportion of coffee to water, temperature of water and pressure during brewing) has been investigated by panel sensory analysis and physico-chemical measurements (soluble contents, pH, acidity, viscosity, optical density, electrical conductivity and caffeine). The study has been performed on a standard *Arabica* roasted coffee and with an experimental extraction machine (expresso type) permitting control of the processing conditions. A linear multiple regression analysis demonstrated that the brewing temperature and the grind-water ratio were the main parameters influencing the soluble content of the extract. They also influenced qualitatively the extract as shown by sensory analysis and physico-chemical properties. An attempt was made to optimize the brewing conditions in order to obtain a coffee beverage with definite organoleptic properties. AA

COCOA

2992 FORESTERLING (G), KLEINSTUCK (K), LOSER (U) and TSCHEVSCHNER (HD). The information content of direct X-ray analyses performed to characterize the state of cocoa butter and the conditions of its production.
Nahrung. 24(8); 1980; 759-66 (German)
Direct X-ray analyses performed on the model substance cocoa butter revealed a direct relation between the easily measurable quantities of the diffraction pattern (site, intensity and sharpness of the reflexes) and the characteristic parameters of the sample (lattice constants, "perfection" and crystalline fraction), which can be derived from these measured quantities on the one

side and the technological parameters of the manufacturing process (tempering regimen and storage conditions) on the other. For this investigation, the authors used an automated X-ray diffractometer, and developed an optimal measuring strategy where the measured effects are sufficiently great as compared to the errors of measurement, the characterization of one sample required only 30-60 minutes. AA

ALCOHOLIC BEVERAGE

2993 AMBADE (KA) and MEGHAL (SK). Dithiooxamide as a reagent for the detection and spectrophotometric determination of chloral hydrate in alcoholic beverages.
Analyst. 106(1268); 1981; 1237-39
By heating the suspected alcohol sample with dithiooxamide in an alkaline medium over a boiling water bath for 5 minutes, a pink complex (λ_{max} 550 nm) indicating the presence of chloral hydrate is observed. The recovery values of added chloral hydrate (2-6 mg) to different pure alcoholic beverages are in the range 96.6-104%. The method has been described as sensitive, specific and rapid for routine assays. BSN

WINE

2994 SURESH (ER) and ETHIRAJ (S). A note on the effect of heating grape bunches on the composition of musts and wines of some red grape varieties.
Indian J. Hortic. 38(1 & 2); 1981; 66-9
6 varieties (Black Champa, *Tamiiosa romaneasca*, Bangalore Blue, Delaware, Calzin, and Gulabi) of grapes were fermented after heating/steaming for 5 minutes or without heating by traditional method. Musts of most varieties showed an increase in pH, at the same time, there was an increase in total acidity also, which may be due to an increase in tartaric acid. No such definite trend was noticed in the pH and total acidity of the wines prepared from these musts. Alcohol content, volatile acidity, and reducing sugars did not show any significant variation due to heating. The wines made with grapes heated in boiling water had a stronger colour, except in gulabi grapes; steaming did not improve the colour. There appears to be a varietal response to heat treatment. All the varieties showed a favourable effect due to heating in boiling water. Some wines prepared from heated grapes showed improvement in their colour when stored for one year. KMD

2995 McCLOSKEY (LP) and YENGOYAN (LS). Analysis of anthocyanins in *Vitis vinifera* wines and red colour versus aging by HPLC and spectrophotometry.
Am. J. Enol. Vitic. 32(4); 1981; 257-61
The red coldur of wines made from *Vitis vinifera* grapes in ten consecutive years between 1970 and 1979 was studied by measuring the anthocyanins. The anthocyanins were measured in Zinfandel and Cabernet Sauvignon using HPLC and spectrophotometry on newly fermented to very old wine. Also, anthocyanins were measured for three years in wines from the 1977 vintage. Information on Zinfandel anthocyanin composition is presented for the first time. Results show that anthocyanins are important in colour for atleast three years after fermentation and they continue to be present for up to five years. After 10 years of aging the anthocya-

nin levels are a few percent of new wine levels. The cinnamic acid acylated pigments disappear faster than the acetic acid acylated pigments. For unknown reasons it was also found that anthocyanin loss may be halted in some wines showing that they do not disappear linearly with time. AA

2996 CRIDDLE (WJ), GOSWELL (RW) and WILLIAMS (MA). The chemistry of sherry maturation. I. The establishment and operation of a laboratory-scale sherry solera.
Am. J. Enol. Vitic. 32(4); 1981; 262-7
The establishment and operation of a laboratory scale sherry solera under strictly controlled conditions is described. Variations have been made in certain of the sherry-making parameters, and the effect on the quality of the products assessed. The sherry produced (both fino and oloroso styles) has been evaluated by standard sensory methods and shown to be comparable, in most cases, to commercially produced wine. AA

2997 AL-KAISY (AM), SACHDE (AG), GHALIB (HA) and HAMEL (SM). Physical and chemical changes during ripening of some grape varieties grown in Basrah.
Am. J. Enol. Vitic. 32(4); 1981; 268-71
Several physical and chemical characteristics of 10 grape varieties, 5 each of white and black, grown in the warm humid southern part of Iraq, were investigated. Results showed that size of berries, percent of berries and stem in cluster, total soluble solids (TSS) and total acidity (TA) varied among varieties. Average weight per cluster ranged from 160 to 706 g and average weight of 100 berries ranged from 2.0 to 7.8 g. Juice yield increased as percent solids in berries decreased. As ripening progressed the TSS, TSS/TA ratios and pH increased, while TA decreased. The most reliable index for ripening was the TSS/TA ratios. AA

2998 BROWN (MR) and OUGH (CS). A comparison of activity and effects of two commercial pectic enzyme preparations on white grape musts and wines.
Am. J. Enol. Vitic. 32(4); 1981; 272-6
White grape musts of eight different varieties were treated with pectic enzyme preparations. These treatments resulted in increases in total juice yields, clarity of the wine, filterability, methanol production, wine quality, browning capacity and amounts of solids that settled. Standardizing the preparations on the basis of polygalacturonase activity showed that differences in parameters such as browning capacity, methanol production, and juice yield are due to the activity of the preparation on the basis of its apple juice depectinizing activity. AA

2999 MORRIS (JR) and CAWTHON (DL). Yield and quality response of concord grapes (*Vitis labrusca* L.) to mechanize vine prunning.
Am. J. Enol. Vitic. 32(4); 1981; 280-82

3000 MATTICK (LR) and RICE (AC). The use of PVPP for decolourizing wine in the determination of tartrate by the metavanadate method.
Am. J. Enol. Vitic. 32(4); 1981; 297-8
The decolourization of red wines is required for the colorimetric determination of tartaric acid by the metavandate method. The use of charcoal as the decolorizing medium is time consuming. A method is described using a column (7 mm ID and 22 cm long) packed with 0.5 g coarse PVPP (Polyclar AT). The method renders the wine colourless. Comparison of the charcoal and PVPP decolourizing

methods indicated that charcoal can cause variations in the tartrate concentration dependent upon the previous treatment of the charcoal, while PVPP yielded colorimetric results similar to the standard solutions. Studies using red wine which had been previously deacidified by ion exchange and known concentrations of tartaric acid added were analyzed by both methods. AA

BEER

3001 COX (D) and CHAPMAN (C). What's brewing in biotechnology?
Food Flavour. Ingred. Packag. Process. 3(10); 1981; 21-5

3002 SEATON (JC), SUGGETT (A) and MOIR (M). The flavour contribution of sulphur compounds in hops.
MBAA Techn. Quart. 18(1); 1981; 26-30

3003 MOLL (M), FLAYEUX (R) and MULLER (P). Relationship between beer flavour and the composition of barley and malt.
MBAA Techn. Quart. 18(1); 1981; 31-5

3004 CARROLL (TCN) and LAWS (DRJ). Liquid carbon dioxide as a solvent in the brewing industry.
MBAA Techn. Quart. 18(1); 1981; 42-8

3005 McGREGOR (AW) and DAUSSANT (J). Isoelectric focusing and immunochemical analysis of germinated barley α-amylases after freeze-drying and kilning.
J. Inst. Brew. 87(3); 1981; 155-7

3006 GOERTH (K) and RADOLA (BJ). A simple method for testing beer filterability.
J. Inst. Brew. 87(3); 1981; 160-62
Based on a filtration manifold from 'Millipore', a method was developed which permits the simultaneous investigation of the filterability of up to ten beer samples. Characteristics of the simple apparatus are the use of sheet filters, a vacuum filtration at room temperature and very small sample volumes. An excellent correlation to the differential pressure at the industrial filter was found, demonstrating the reliability of the test for routine applications. The usefulness of the method for research applications was demonstrated in experiments with enzymes improving beer filtration. AA

3007 BAXTER (ED) and REEVES (SG). The effects on malt of high temperatures during the last day of germination.
J. Inst. Brew. 87(3); 1981; 169-72

3008 BAXTER (ED). Hordein in barley and malt. A review.
J. Inst. Brew. 87(3); 1981; 173-6
Discusses: barley; changes during germination; barley malt; composition and changes in hordein during mashing and worting. BSN

3009 THURSTON (PA) and TUBB (RS). Screening yeast strains for their ability to produce phenolic off-flavours: A simple method for determining phenols in wort and beer.
J. Inst. Brew. 87(3); 1981; 177-9

WHISKEY

3010 REAZIN (GH). Chemical mechanisms of whiskey maturation.
Am. J. Enol. Vitic. 32(4); 1981; 283-9
Studies of the chemical mechanisms involved in the maturation of whiskey showed that the formation of acetaldehyde, acetic acid, and ethyl acetate originates in the distillate, while ethanol lignin, aromatic aldehydes, sugars and some acetic acid are reaction products of the distillate and wood components. Storage conditions affect these reactions. For example, barrel wood is more reactive when a barrel is charred, causing a higher congener level in the product of the first filling than that of a comparable filling in an uncharred barrel As the barrel is reused, the product congener level approaches that of the uncharred barrel. The effect of recharring the barrels on congener formation is also discussed. The entry proof also affects the levels of congeners present in the final product. As the entry proof increases, those congeners that originate from barrel components decrease. Warehouse temperatures are directly related to the rate,these congeners are formed. The implication of these relationships on the maturation of whiskey is discussed. AA

OILS AND FATS

3011 NESKE (G). Elaboration and application of work standards in the vegetable oil and margarine industry.
Lebensmittelindustrie. 27(9); 1980; 393-4 (German)

3012 SCHOLFIELD (CR). Argentation high performance liquid chromatography of methyl esters.
J. Am. Oil Chem. Soc. 57(10); 1980; 331-4

3013 TRAITLER (H), LORBEER (E) and KRATZL (K). n-alkylbenzenes and ω-phenylcarboxylic acids from the thermal treatment of fatty acids with kraft lignin.
J. Am. Oil. Chem. Soc. 57(10); 1980; 335-9

3014 LEGENDRE (MG), DUPUY (HP), RAYNER (ET) and SCHULLER (WH). Rapid instrumental technique for the analysis of volatiles in salad dressing.
J. Am. Oil. Chem. Soc. 57(10); 1980; 361-2
A simple, rapid, efficient procedure for analyzing the volatile components in salad dressings is described. A unique inlet system, used in conjunction with gas chromatography and mass spectrometry, provides an objective, tangible profile of volatiles characteristic of the product. The individual components may be identified to qualify more effectively the odour and flavour quality of the specimen. AA

3015 AHMAD (MS) and OSMAN (SM). Simmons-Smith reaction of allylic hydroxylated long chain α, β-unsaturated esters.
J. Am. Oil Chem. Soc. 57(10); 1980; 363-4

SPICES AND CONDIMENTS

3016 SIEBERT (G). New standards for spices.
Lebensmittel, industrie. 27(9); 1980; 408-11 (German)
This article deals with the specified standards for dried marjoram leaves, dried parsley leaves, dried savory leaves, dried thyme leaves, dried celery leaves, caraway, coriander, cloves, clovestems, and star aniseed, which are obligatory since 1980. AA

VINEGAR

3017 NAKAYAMA (S). Equipments for vinegar production by aeration.
J. Jpn. Soc. Food Sci. Technol. 27(8); 1980; 403-6 (Japanese)
This study was carried out to improve the vinegar production for a small or middle-scale factory. Results obtained were as follows: 1) For a small-scale factory a 200 L fermentor was sufficient for the production of vinegar. The average velocity of acid formation was 0.14 g/100 ml/hour and necessary amount of aeration was 2.4 times of theoretical value. 2) For a middle-scale factory a 1,000 L fermentor was suitable. This equipment gave satisfactory result concerning the velocity of acid formation as well as acetification ratio from ethanol. 3) The aeration method for producing vinegar had advantages in respect to utilization ratio of ethanol in mash, and saving the space for the production. AA

3018 KEARSLEY (MW) and GIBSON (WJ). Rapid differentiation between vinegars and non-brewed condiments.
J. Assoc. Public Anal. 19(Pt.3); 1981; 83-9
Two rapid methods of differentiating between vinegar and non-brewed condiments are proposed. The first method is based on the ultra-violet absorption of the distilled sample and can be used as a rapid sorting method, although the data need careful interpretation as some samples produce ambiguous results. The second method is based on the osmotic pressure or freezing point depression of the distilled neutralised sample and no anomalies were found with, differentiation being straight forward. AA

PEPPER

3019 SRINIVASAN (MR) and SATYANARAYANA (MN). Effect of black pepper (*Piper nigrum* Linn) and piperine on growth, blood constituents and organ weight in rats.
Nutr. Rep. Int. 23(5); 1981; 871-6
The food efficiency of rats fed black pepper at 0.02 to 0.5% in a synthetic diet is not adversely affected. At higher levels viz, 2 and 5% the food efficiency is significantly lowered due mainly to reduced food intake. Piperine (the main pungent principle) at 0.05% in a similar synthetic diet does not affect the food efficiency but caused increased food intake. Black pepper at 2 and 5% and piperine at 0.05% caused an increase in liver weight mainly due to higher total and neutral lipids content. The increase in liver total and neutral lipids with 0.5% black pepper, is annulled when the protein content of diet is increased to 18%. With

0.02 or 1.15% black pepper - levels corresponding to human intake or ten times higher, no adverse effect is noticed in liver weight and liver lipids. AA

SENSORY EVALUATION

3020 SIDEL (JL), STONE (H) and BLOOMQUIST (J). Sharper methods of sensory analysis.
MBAA Techn. Quart. 18(1); 1981; 3-6

3021 LARMOND (E). Better reports on sensory evaluation.
MBAA Techn. Quart. 18(1); 1981; 7-10

3022 POWERS (JJ). Multivariate procedures in sensory research: Scope and limitations.
MBAA Techn. Quart. 18(1); 1981; 11-21

3023 WORD (KM) and GRESS (HS). Selection, training and motivation of sensory panel judges.
MBAA Techn. Quart. 18(1); 1981; 22-5

3024 ANON. The quality of foods and beverages.
Food Flavour. Ingred. Packag. Process. 3(10); 1981; 7-11
A brief resume of the proceedings of the second international flavour conference on the quality of foods and beverages - recent developments in Chemistry, held at Athens on July 20-24, 1981. BSN

3025 GARCIA-MEDINA (MR). Flavour-odour taste interactions in solutions of acetic acid and coffee.
Chem. Senses. 6(1); 1981; 13-22
Two experiments explored the relation between flavour magnitude and odour and taste magnitudes of acetic acid and coffee. In the case of acetic acid, all three attributes (odour, taste, flavour) varied with concentration in approximately the same way. Flavour fell slightly, but uniformly, below the sum of odour magnitude and taste magnitude. In the case of coffee, flavour and taste magnitude grew relatively rapidly and odour relatively slowly with concentration. Nevertheless, flavour again fell uniformly below the sum of odour magnitude and taste magnitude. A vector summation model previously applied with success to odour mixtures provided a very adequate description of the relation between flavour and its constituents. The applicability of the model in the present instance implies that neither taste nor smell contributes to flavour at the expense of the other. AA

3026 BIRCH (GG) and MUNTON (SL). Use of the "Smurf" in taste analysis.
Chem. Senses. 6(1); 1981; 45-52

3027 HALMOS (AL) and TIU (C). Liquid foodstuffs exhibiting yield stress and shear-degradability.
J. Texture Stud. 12(1); 1981; 39-46
Two rheological properties of liquid foodstuffs often encountered in practice are the yield stress and the shear-degradability (irreversible time-dependence). Both these properties were determined for meat and yeast extracts using two rotational viscometers.

The material constants were obtained and fitted with Bingham Plastic and Herschel-Bulkley models for the meat extracts. The shear-degradability exhibited by the yeast extract was quantified in terms of the energy required to destroy the material structure. AA

3028 LANG (ER) and RHA (C). Determination of the yield stress of hydrocolloid dispersions.
J. Texture Stud. 12(1); 1981; 47-62

FOOD STORAGE

3029 ANON. Shelf life of food.
Food Technol. NZ. 16(2); 1981; 5,6,9-11
A report from the United States by the Institute of Food Technologists Expert Panel in Food Safety and Nutrition and the Committee on Public Information, tries to answer questions like What causes food to change during storage? What actually happens during long term storage? How does temperature affect nutritional quality? How does environment affect shelf life? and Is open dating a satisfactory answer. KAR

3030 BANKS (HJ). Effect of controlled atmosphere storage on grain quality : A review.
Food Technol. Aust. 33(7); 1981; 335-40
This review presents the data available in the literature on the effect on grain quality of lowered oxygen and raised CO_2 levels in storage environments. KAR

INFESTATION CONTROL AND PESTICIDES

3031 ANDREWS (W). The ravening hordes.
Food Manuf. 56(8); 1981; 18-9, 21
Briefly discusses the problem of insects, rats, mice and birds which infest food and cause food losses. BSN

3032 OAKLAND (JS). Pest management: Need for integrated approach.
Pesticides. 15(9); 1981; 3-6, 9

3033 JOTWANI (MG) and SRIVASTAVA (KP). Neem: Insecticide of the future I. As protectant against stored grain pests.
Pesticides. 15(10); 1981; 19-23

3034 VEERESH (GK), RAJAGOPAL (D) and SHIVASHANKAR (T). Comparative efficacy of some newer pesticides used against cockroaches.
Pesticides. 15(10); 1981; 37-42

3035 FERKOVICH (SM), OBERLANDER (H) and LEACH (CE). Chitin synthesis in larval and pupal epidermis of the Indian meal moth, *Plodia interpunctella* (Hubner), and the greater wax moth, *Galleria mellonella* (L.).
J. Insect Physiol. 27(8); 1981; 509-14

3036 BANSODE (PC), CAMPBELL (WV) and NELSON (LA). Toxicity of four organophosphorus insecticides to a malathion-resistant strain of the Indian meal moth in North Carolina.
J. Econ. Entomol. 74(4); 1981; 382-4

A field-collected and a laboratory strain of *Plodia interpunctella* (Hubner) were treated in the laboratory with malathion and four other organophosphorus compounds. Studies revealed that the field strain of *P. interpunctella* was >227-fold resistant to malathion. Since most resistance was suppressed by the synergistic action of triphenyl phosphate, the carboxyesterase appears to play a major role in the detoxification mechanism of malathion in this strain. The malathion-resistant strain showed a low level of tolerance to the other four organophosphorus compounds. Tolerance levels to these compounds were : pirimiphos methyl x 1.9:fenitrothion x 1.6; bromophos x 1.3; CGA-20168 (transphosphorothioic acid O,O-dimethyl O-(2-methoxycarbonyl-2-methylvinyl-ester) x 1.5. AA

3037 NAKAKITA (H) and WINKS (RG). Phosphine resistance in immature-stages of a laboratory selected strain of *Tribolium castaneum* (Herbst) (Coleoptera: Tenebrionidae).

Responses to phosphine of immature stages of an adult-selected, phosphine-resistant strain of *Tribolium castaneum* (Herbst) were studied and compared with those of a phosphine-suceptible strain. Larvae (15 and 20-day old) pre-pupae and pupae (early-, mid- and late-) were examined and found resistant to phosphine. The highest resistances were present in early- and mid-pupae at levels much higher than those selected in the adults. Latent toxic effects were observed following treatment of all stages except 15-day larvae and were most pronounced with 20-day larvae. Respiration rates in a normal atmosphere were similar in the two strains on a body-weight basis and differed in terms of oxygen consumption per individual in accordance with the weight differences between the two strains. Normal respiration rates did not account for, or contribute towards, the observed tolerance differences between the two strains. The oxygen consumption of all examined stages of the resistant strain was reduced less by phosphine than that of the corresponding stages of the susceptible strain, but the significance of this in terms of phosphine uptake is not known. AA

3038 LONGSTAFF (BC). Density-dependent fecundity in *Sitophilus oryzae* (L.) (Coleoptera: Curculionidae).
J. Stored Prod. Res. 17(2); 1981; 73-6

An experiment to assess the effect of population density upon the fecundity of *Sitophilus oryzae* (L.) is described. The range of densities employed is rather wider and somewhat lower than used in the earlier study of MacLagan and Dunn (1935). Whereas the results of this earlier study suggested a hyperbolic relationship between fecundity and population density, the present study suggests that there is an optimum population density above and below which fecundity is reduced. A mathematical model is fitted to the data. The implications of this more complex relationship are discussed. AA

3039 BOWLEY (CR) and BELL (CH). The toxicity of twelve fumigants to three species of mites infesting grain.
J. Stored Prod. Res. 17(2); 1981; 83-7

Eggs of *Tyrophagus longior*, *Acarus siro* and *Glycyphagus destructor* were highly tolerant of each fumigant tested at 10 C while mobile stages were susceptible. Some eggs of *T. longior* survived

the highest test dosages of methyl bromide, phosphine, ethylene oxide, ethyl formate, methallyl chloride and ethyl bromide. The ascending order of toxicity for the other fumigants, as judged by the *ct* product needed to kill all eggs, was methyl chloroform (MC), carbon tetrachloride (CTC), ethylene dichloride (EDC), methyl formate, ethylene dibromide and acrylonitrile. The toxicity of EDC was generally enhanced by the addition of MC or CTC, though dosages for control were still high, and a single fumigation can only be expected to provide a short-term absence of mobile stages. If complete control is required, this can be achieved by two treatments at a low dose if these are separated by an interval during which the surviving eggs hatch, but do not reach the adult stage. The length of this interval depends on temperature and at 10 C is about 7 weeks, at 15 C 3 weeks and at 20 C 2 weeks. AA

3040 WRIGHT (CG), LEIDY (RB) and DUPREE (HE) Jr. Insecticides in the ambient air of rooms following their application for control of pests.
Bull. Environ. Contam. Toxicol. 26(4); 1981; 548-53

3041 DAS PURAYAKAYASHTA (PC). Roderts: A problem to poultry farmers.
Poult. Guide. 18(11); 1981; 105-6

3042 RENAPURKAR (DM). Distribution of periodomestic and wild rodent fauna in Maharashtra State.
Pestology. 5(3); 1981; 34-5

3043 ANON. Pesticides: An industry view of safety.
Pesticides. 15(9); 1981; 38

3044 ANON. Spray volume.
Pestology. 5(3); 1981; 9-16
Briefly discusses : application technique; carrier; spray volume and rate; calibration of knap sack sprayer; atomization; droplet spectrum; volume and number median diameter (VMD and NMD); droplet-volume relation or volume relation with spray technique; and spray volume-reduction and coverage. BSN

3045 KUSHWAHA (KS) and GUPTA (HCL). Extraction and clean up technique es for aldrin and dieldrin residue estimation.
Pestology. 5(3); 1981; 17-9
n-hexane at 2 and 4 ml/g sample was employed for extraction of aldrin/dieldrin form soil and plant extracts. For extraction of the insecticide from grain, acetone at 4 ml/g was used. For clean up of plant or bajra or maize extracts, Nuchar C-190N was used as adsorbent at 0.5 g/50 ml aliquot. Recoveries for aldrin/dieldrin from soil, plant and grain samples were between 76.74 to 96.84 percent respectively. BSN

3046 NATESAN (R) and SREE RAMULU (US). Modifications of the analytical techniques for estimation of BHC and fenitrothion formulations.
Pestology. 5(3); 1981; 20-21
For routine analysis of BHC upto 50% active ingredient content, seven extractions with solvent were found necessary. For formulations, however, ten extractions may be required in the repeat analysis. Three extractions with 50 ml of the extractant each time, may be employed instead of 100 ml each time for fenitrothion extraction. BSN

BIOCHEMISTRY AND NUTRITION

3047 NAKAI (S), HO (L), HELBIG (N), KATO (A) and TUNG (MA). Relationship between hydrophobicity and emulsifying properties of some plant proteins.
Can. Inst. Food Sci. Technol. J. 13(1); 1980; 23-7

3048 FRIEDRICH (M), SCHENK (G) and NOACK (R). Studies on the physiological importance of the microvilli-bound leucine arylamidase in the final digestion of proteins. Part I. Purification and isolation of intestinal leucine arylamidase and aminotripeptidase of the rat.
Nahrung. 24(8); 1980; 727-34 (German)
The membrane-bound leucine arylamidase of the microvilli of the small intestine of the rat was solubilized by Triton X-100 and purified by gel and ion-exchange chromatography. As compared to the mucosa homogenate, the purification factor was 135. The leucine arylamidase and aminotripeptidase of the microville cannot be separated by chromatography. The cytosomal portion of the aminopeptidase in devoid of leucine arylamidase activity. AA

3049 FRIEDRICH (M), UHLIG (J), SCHENK (G) and NOACK (R). Studies on the physiological importance of the microvilli-bound leucine arylamidase in the final digestion of proteins. Part II. Comparison of the exopeptidatic activities of purified leucine arylamidase, purified microvilli and microvilli sediment.
Nahrung. 24(8); 1980; 735-40
The exopeptidatic activities of three enzyme sources were studied by determining the liberation of amino acids from a casein pre-cleaved by pepsin and pancreatic enzymes. Leucine arylamidase has a characteristic spectrum of liberated amino acids. The activities and the specificities of purified leucine arylamidase and purified microvilli are very similar. AA

3050 BARCHET (R) and WILK (G). An investigation into the daily absorption of cadmium in food by means of emission spectroanalysis.
Dtsch. Lebensmittel-Rundschau. 76(10); 1980; 348-51 (German)
By means of a well known procedure of emission spectrography, we have examined the overall daily food rations issued by a hospital kitchen to determine the amount of cadmium fed into a man's body with his food supply. The lowest amount of cadmium identified was 1.4 µg per day, while the highest was 588 µg/day. In some samples the authors traced no cadmium at all. As an average cadmium absorption, the authors computed an amount of 56.9 µg per day or 398.3 µg per week. This means that the cadmium supply through foodstuffs is still below the limit of 400 to 500 µg per week, which the world Health Organization considers "temporarily tolerable". AA

3051 ANTENER (I), VERWILGHEN (AM), VAN GEERT (C) and MAURON (J). Biochemical study of malnutrition.
Int. J. Vitamin Nutr. Res. 51(3); 1981; 297-306

3052 KHAN (MA). Nutrition and current concepts of obesity.
CRC Crit. Rev. Food Sci. Nutr. 14(2); 1981; 135-51

3053 MONTELLANO (MA), GONZALEZ (A), URBANO (G) and VARELA (G). The effect of the quality and quantity of dietary protein on the nutritive utilization.
Rev. Agroquim. Tecnol. Aliment. 20(1); 1980; 125-30 (Spanish)

In Nestle rats of both sex, fed *ad libitum* with isocaloric diets containing different sources and levels of protein, the nutritive utilization of protein has been studied. The sources and levels of protein considered were: casein +5% DL-methionine, 12% same heated 20 minutes at 180 C, 12%; soyabean, meal, 10 and 20%; lentil, 10 and 20%. The intake of food was significantly increased with increasing protein quality. Average daily gain weight was affected by the quality and level of protein. Protein absorption depends on the quality of dietary protein. Daily nitrogen retention was increased with increasing protein quality and reaches the maximum at a lower protein level for the diets of best protein quality. AA

3054 HUQUE (T). Assessment of vitamin A status by an isotope dilution method.
Int. J. Vitamin. Nutr. Res. 51(2); 1981; 119-23

3055 BAPU RAO (S) and TULPULE (PG). Vitamin B_6 content of some Indian foods and regional diets and effect of cooking on the vitamin content.
Indian J. Nutr. Dietet. 18(1); 1981; 9-14

Eighteen foods were analysed for vitamin B_6 content; wheat, pulses, potato and banana were found to be good sources, whereas rice, jowar, cabbage and groundnuts were relatively poorer and milk and leafy vegetables the poorest sources of vitamin B_6. Vitamin B_6 intake was computed for various groups of population and also for different states in India. The diets consumed in Punjab and Madhya Pradesh were adequate and the diets of Rajasthan and Himachal Pradesh had just sufficient amounts of vitamin B_6. The vitamin B_6 intake in other states like Kerala, Gujarat and Tamil Nadu and by various segments of population group such as preschool children, pregnant and nursing women was far below the recommended intake. The extent of loss of vitamin B_6 during cooking was investigated in six regional diets. No appreciable loss of vitamin B_6 was observed in diets after cooking and this was attributed to the nature and form of the vitamin present in foods of plant origin. AA

3056 LEINERT (J), SIMON (I) and HOTZEL (D). Methods and evaluation to analyse the vitamin B_6- status on humans.
Int. J. Vitamin. Nutr. Res. 51(2); 1981; 145-54 (German)

3057 CHATTERJEE (K), BANERJEE (SK), TIWARI (R), MAZUMDAR (K), BHATTACHARYYA (A) and CHATTERJEE (GC). Studies on the protective effects of L-ascorbic acid in chronic chlordane toxicity.
Int. J. Vitamin Nutr. Res. 51(3); 1981; 254-65

TOXICOLOGY AND HYGIENE

3058 ANON. Twenty years of toxicology.
Food Cosmet. Toxicol. 19(5); 1981; 529-682

This special issue dedicated to Leon Golberg, contains following papers on toxicology: Twenty years of toxicology by D.M canning (p. 529-30); FCT - The early years by A.J. Cohen (p. 531); The delayed long-term effects of chemicals following neonatal exposure in laboratory animals by T. Balazs (p. 533-7); Rethinking the environmental causation of human cancer by J. Higginson (p. 539-48); Risk assessment and regulatory decision making by I.C.

Munro and D.R. Krewski (p. 549-60); The decision-point approach for systematic carcinogen testing by J.H. Weisburger and G.M. Williams (P. 561-6); Genetic and nongenetic events in neoplasia by W.T. Scott, R.H. Reitz; A.M. Schumann and P.G. Watanabe (p.567-76); Liver carcinogenesis: The role for some chemicals of an epigenetic mechanism of liver-tumor promotion involving modification of the cell membrane by G.M. Williams (p. 577-83); Review of the hepatic response to hypolipidaemic drugs in rodents and assessemnt of its toxicological significance to man by A.J. Cohen and P. Grasso (p. 585-605); Interspecies response to carcinogens and oestrogens by V.A. Drill (p. 607-10); Studies on the mechanism of carcinogenicity of diethylstilboestrol; Role of metabolic activation by M. Metzler (p. 611-5); Structure-mutagenicity analysis with the CHO/HGPRT system by A.W. Wsie (p. 617-21); Bioassay for evaluating the potency of airborne sensory irritants and predicting acceptable levels of exposure in man by Y. Alarie (p. 623-6); Action of N-diethylacetamide on hepatic microsomal drug metabolizing enzymes by F.E. Beyhl and E. Lindner (p. 627-9); The impact of air-lead on blood-lead in man - A critique of the recent literature. P.B. Hammond, E.J. O'Flaherty and P.S. Gartside (p. 631-8); The role of zinc in nitrilotriacetate (NTA) - Associated renal tubular cell toxicity by R.L. Anderson (p. 639-50); Failure of chloroform to induce chromosome damage or sister-chromatid exchanges in cultured human lymphocytes and failure to induce reversion in *Escherichia coli* by D.J. Kirkland, K.L. Smith and N.J. Van Abbe (p. 651-6); Safrole: Its metabolism, carcinogenicity and interactions with cytochrome p-450 by C. loannides, M. Delaforge and D.V. Parke (p. 657-66); sulphite toxicity. A critical review of *in vitro* and *in vivo* data by A.F. Gunnison (p. 667-82). BSN

3059 KADAM (SS), NERKAR (YS) and SALUNKHE (DK). Subtoxic effects of certain chemicals on food crops.
CRC Crit. Rev. Food Sci. Nutr. 14(1); 1981; 49-109
Discusses : stimulation of plant growth and yield by chemical treatments; effects of chemicals on proteins, amino acids and carbohydrates; effect on fat and vitamin contents of food crops treated with chemicals; effect on mineral and pigment contents; effect of chemicals on toxin content; effect on retention of nutrients and quality in plant products. BSN

3060 GALLI (CL), MARINOVICH (M) and COSTA (LG). Absorption, distribution and excretion of (^{14}C) carmoisine in mice after oral and intravenous administration.
Food Cosmet. Toxicol. 19(4); 1981; 413-8
Radioactivity was almost completely (98%) excreted in the faeces and urine within 16-32 hours after oral dosing. The plasma (^{14}C) radioactivity decay curve after iv administration indicated a very rapid distribution of the compound into the tissues ($t_{1/2}$= 10 minutes) and an efficient excretion, mostly through the gastrointestinal tract (92%), which was complete in 48 hours after dosing. AA

3061 VAN ABBE (NJ). Use of S-9 mix in mutagenicity tests of urine concentrates.
Food Cosmet. Toxicol. 19(4); 1981; 524

3062 UNGER (PD), SALERNO (AJ) and FRIEDMAN (MA). Disposition of (^{14}C)-caprolactam in the rat.
Food Cosmet. Toxicol. 19(4); 1981; 457-62

The tissue distribution and excretion of (carbonyl-^{14}C) caprolactam was studied in male Fischer 344 rats which were given a single oral dose of 0.18 mg/kg body weight, or a high dose of 1.5 g caprolactam/kg. The pattern of tissue distribution of radioactivity was the same at both these doses. Elimination of radioactivity in the urine and expired air was most rapid during the first 6 hours. Over a 24 hours period, 77.6% of the radioactivity was excreted in the urine, 3.5% in the faeces, and 1.5% in the expired air. KMD

3063 MERSKI (JA). Acute structural changes in renal tubular epithelium following administration of nitrilotriacetate.
Food Cosmet. Toxicol. 19(4); 1981; 463-70

Nitrilotriacetate (NTA) is an effective chelating agent that is used in detergent formulations. It is known to produce non-neoplastic renal lesions. The present study showed that three grades of vacuolar lesion could be distinguished in rats over a range of NTA doses, i.e. 0.11 to 7.3 m mol/kg. The lesions developed between 1.5 and 6 hours after treatment with a 7.3 m mol/kg dose of NTA. All the vacuolar lesions were reversible; the severest lesions persisted for up to 72 hours after treatment. KMD

3064 TOMOKUNI (K) and OGATA (M). Relationship between lead concentration in blood and the activities of erythrocyte pyrimidine 5'-nucleotidase and delta-aminolevulinate dehydratase in the mice exposed to lead.
Arch. Toxicol. 47(1); 1981; 67-9

3065 RABAR (I) and KOSTIAL (K). Bioavailability of cadmium in rats fed various diets.
Arch. Toxicol. 47(1); 1981; 63-6

3066 RAFFKE (W), CUMBROWSKI (J) and JACOBI (J). The cadmium contents of foods and human organs in a large town.
Nahrung. 24(8); 1980; 797-802 (German)

The cadmium contents of commercial foodstuffs and human organs were determined by means of atomic absorption spectrophotometry. Meat and meat products had low cadmium content 0.01-0.08 mg/kg. The vegetables had an average cd content of 0.03-0.06 mg/kg. This cadmium intake corresponds to about 50% of WHO/FAO value. The cadmium contents of human organ samples in GDR were lower than those in Sweden, Japan or the USA. KMD

3067 MUNCE (BA). The role of the food service industry in the microbiological safety of food : A review.
Food Technol. Aust. 33(7); 1981; 326,328,330-31

This review covers, cases of food poisoning outbreaks; their causes, control measures including those pertaining to hygiene of premises and equipment, quality and functions of supervisory staff; modification of traditional food handling techniques, and the management approach. KAR

3068 TREVORS (JT), MAYFIELD (CI) and INNISS (WE). A rapid toxicity test using *Pseudomonas fluorescens*.
Bull. Environ. Contam. Toxicol. 26(4); 1981; 433-9

3069 BEZANSON (GS), PAUZE (M) and LIOR (H). Antibiotic resistance and R-plasmids in food chain *Salmonella*: Evidence of plasmid relatedness.
Appl. Environ. Microbiol. 41(3); 1981; 585-92

3070 KRYSINSKI (EP) and SUGIYAMA (H). Nature of intracellular type A Botulinum neurotoxin.
Appl. Environ. Microbiol. 41(3); 1981; 675-8

3071 WICKLOW (DT), SHORTWELL (OL) and ADAMS (GL). Use of aflatoxin-producing ability medium to distinguish aflatoxin-producing strains of *Aspergillus flavus*..
Appl. Environ. Microbiol. 41(3); 1981; 697-9
Aflatoxin-producing ability medium was tested for its ability to distinguish aflatoxin-positive from aflatoxin-negative strains of *Aspergillus flavus* in naturally occurring populations from corn at harvest. All of the aflatoxin-positive strains and some of the aflatoxin-negative strains produced aflatoxins when cultured on cracked corn. Although the data indicate that aflatoxin-producing ability medium is not entirely reliable in distinguishing potential aflatoxin-producing strains of A. *flavus* from non-toxigenic strains, it is significant that the medium did not yield false-positives. AA

3072 FRISVAD (JC). Physiological criteria and mycotoxin production as aids in identification of common asymmetric penicillia.
Appl. Environ. Microbiol. 41(3); 1981; 568-79

3073 BUCKER (ER) and MARTIN (SE). Superoxide dismutase activity during recovery of thermally stressed *Staphylococcus aureus* MF-31.
Appl. Environ. Microbiol 41(3); 1981; 700-704

3074 THIAN (TS) and HARTMAN (PA). Gentamicin-thallous-carbonate medium for isolation of fecal streptococci from foods.
Appl. Environ. Microbiol. 41(3); 1981; 724-8
Gentamicin-thallous-carbonate (GTC) agar was formulated by Donnelly and Hartman (*Appl. Environ. Microbiol.* 35; 576-581,1978) to select for fecal streptococci in sewage and water samples. The present study was conducted to determine the usefulness of GTC agar for the enumeration of fecal streptococci in foods. Comparisons were made with KF streptococcal (KF), Pfizer selective enterococcus (PSE), and thallous acetate (TA) agars. Samples of ground beef, pork sausage, frozen broccoli, frozen fish, and ice cream were examined. Presumptive streptococcal counts obtained on GTC agar were significantly higher than those obtained on KF and PSE agars and were comparable to those obtained on TA agar. GTC was more sensitive than KF or PSE agars primarily because of the recovery of greater numbers of *Streptococcus bovis* and *Streptococcus equinus* strains. Percentages of confirmed fecal streptococci obtained on GTC, KF, PSE, and TA agars were 70,95,80, and 74, respectively. Differences between these percentages were not statistically significant, but they indicated that selectivity of GTC agar could be improved. Advantages of using GTC agar to isolate fecal streptococci from foods include a short incubation time (16 to 18 hours) and large, distinct colonies that facilitate rapid enumeration and subsequent confirmation. AA

3075 JOYOTI GUPTA, BHARATI PATHAK, SETHI (N) and VORA (VC). Histopathology of mycotoxicosis produced in Swiss albino mice by metabolites of some fungal isolates.
Appl. Environ. Microbiol. 41(3); 1981; 752-7
Of 199 fungal cultures isolated from some of the common cereals collected from different parts of Uttar Pradesh and Madhya Pradesh, 70 produced toxic metabolites. Of the 70 fungi isolated, 59 produced toxins which caused visible lesions in livers, kidneys, and spleens but did not cause mortality. Toxicity, graded in terms of

the mortality rate and the extent of lesions in livers, kidneys, and spleens, was found to be highest in various species of *Aspergillus* (40%), followed by *Chactomium* spp. (31%). AA

3076 REDDY (SJ). The problem of mycotoxins in feeds.
Poult. Guide. 18(11); 1981; 47-8

3077 KRIEK (NPJ), MARASAS (WFO) and THIEL (PG). Hepato- and cardiotoxicity of *Fusarium verticillioides* (*F. moniliforme*) isolates from Southern African maize.
Food Cosmet. Toxicol. 19(4); 1981; 447-56

Fusarium verticillioides is the fungus most commonly associated with mouldy maize. This fungus is known to produce a toxin called moniliformin. However, 21 strains of *Fusarium verticillioides* have been isolated from South African and Transkeian maize which do not produce moniliformin, but are still toxic to ducklings and rats. The pathology induced by one of the strains has been fully characterized, and compared with that caused by other strains. KMD